

**EPA Superfund  
Record of Decision:**

**ROSS METALS INC.  
EPA ID: TND096070396  
OU 02  
ROSSVILLE, TN  
09/17/2002**

**ROSS METALS  
SUPERFUND SITE  
OPERABLE UNIT 2**

**RECORD OF DECISION**  
September 17, 2002



**U.S. Environmental Protection Agency  
Region 4**

## RECORD OF DECISION

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## **1.0 DECLARATION**

### **SITE NAME AND LOCATION**

Ross Metals, Operable Unit # 2  
100 North Railroad Street  
Rossville, Fayette County, Tennessee

EPA ID: TND096070396

### **STATEMENT OF BASIS AND PURPOSE**

This decision document presents the selected remedial action for the Ross Metals Site, Operable Unit #2, in Rossville, Fayette County, Tennessee. This action is chosen in accordance with Comprehensive Environmental Response Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and, to the extent practicable, the National Contingency Plan. This decision is based on the Administrative Record for this Site.

The State of Tennessee concurs with the Selected Remedy.

### **ASSESSMENT OF THE SITE**

The response action selected in this Record of Decision is necessary to protect public health or welfare or the environment from actual or threatened releases of pollutants or contaminants from this Site which may present an imminent and substantial endangerment to public health, welfare, or the environment.

### **DESCRIPTION OF THE REMEDY**

This operable unit is the second of two operable units for the Site. This operable unit remedy addresses groundwater which is not considered to be a source material. Operable Unit #1 addressed source materials ( soil, sediment, waste, pavement, and debris) through treatment and off-Site disposal of principal and low-level threat wastes.

The major components of this remedy, Operable Unit # 2 include:

- Implementation of institutional measures to control future development and prevent installation of wells within the contaminant plume boundary by placing access and use restrictions on all properties within the contaminant plume boundary;
- Review/collection of hydrological, geochemical, and microbial data as needed to establish use of monitored natural attenuation; and
- Development of monitoring program, including monitoring frequency and identification of a monitoring well network to confirm that contaminant mobility reduction or concentration reduction is proceeding at rates consistent with meeting cleanup objectives.

### **STATUTORY DETERMINATIONS**

The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable for the Site. The remedy in this Operable Unit does not satisfy the statutory preference for treatment as a principal element of the remedy because natural processes will reduce the lead concentrations in groundwater to an acceptable level. The two alternatives that do involve treatment as a principal element were judged no better than

the Selected Remedy at satisfying the Threshold Criteria and were much more expensive.


Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

#### ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this Record of Decision. Additional information can be found in the Administrative Record file for this Site.

- Chemicals of Concern (COCs) and their respective concentrations;
- Baseline risk represented by the COCs;
- Cleanup levels established for COCs and the basis for the levels;
- Current and future land and groundwater use assumptions used in the baseline risk assessment and ROD;
- Land use that will be available at the Site as a result of the Selected Remedy;
- Estimated capital, operation and maintenance (O&M), and total present worth costs; discount rate; and the number of years over which the Remedy cost estimates are projected; and
- Decisive factors that led to selecting the Remedy (i.e., description of how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria).

17 SEP 02  
Date

  
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Richard D. Green, Director  
Waste Management Division

## 2.0 DECISION SUMMARY

### 2.1 SITE NAME, LOCATION, AND DESCRIPTION

The RM Site is located at 100 North Railroad Street in Rossville, Fayette County, Tennessee, (see **Figure 2-1**). The EPA identification number is TND096070396. The United States Environmental Protection Agency, Region 4 is the lead agency for the Remedial Investigation/ Feasibility Study (RI/FS) that has been conducted at the RM Site. The Tennessee Department of Environment and Conservation has been the support agency. The RI/FS has been conducted using the Superfund trust fund. The RM Site operated as a secondary lead smelter from 1978 to 1992. The facility processed spent lead-acid batteries, lead dross, lead scrap, and other lead bearing material into reusable lead alloy. The Site is located in a rural, residential area. It includes the former process area, an unlined landfill and wetlands located north and east of the process area and a Site layout is presented in **Figure 2-2**. *Note that this Site layout predates the building demolition and excavation work that has been conducted as part of the OU #1 remedy.*

### 2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

From 1978 until June 20, 1992, RM operated a secondary lead smelter at the Site. Prior to 1978, the property was undeveloped. RM produced specification alloyed lead that was sold for use in manufacturing vehicle batteries, lead shot pellets, and sheet lead (radiation

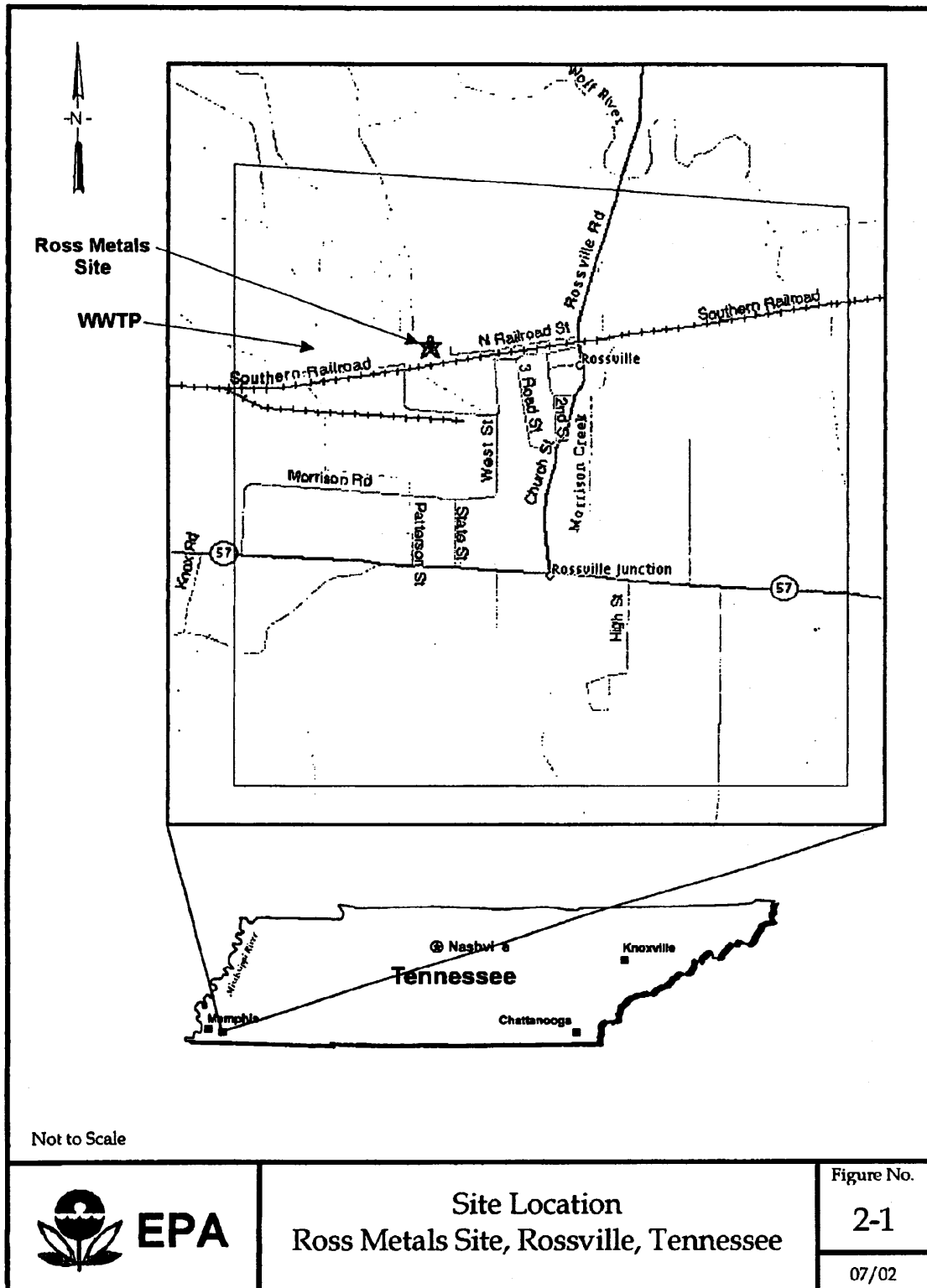
shields). The facility received spent lead acid batteries, spent lead plates, lead oxide, scrap metal, and other lead waste and material from various businesses and industries, including battery crackers and battery manufacturers. The primary material used for the recycling process was spent lead acid batteries, with automotive and industrial batteries accounting for 80 percent of the raw material processed. The remaining 20 percent consisted of other lead-bearing materials, such as recycled dross, dust slag, and factory scrap. Facility operations included not only the smelting of lead and other scrap metals but a variety of other products, such as crushed drums, limestone, steel, and cast iron. These materials were added to the blast furnace as flux to create a reducing atmosphere. Wastes generated from the process included slag, plastic chips, waste acid, lead emission control dusts, and lead contaminated storm water.

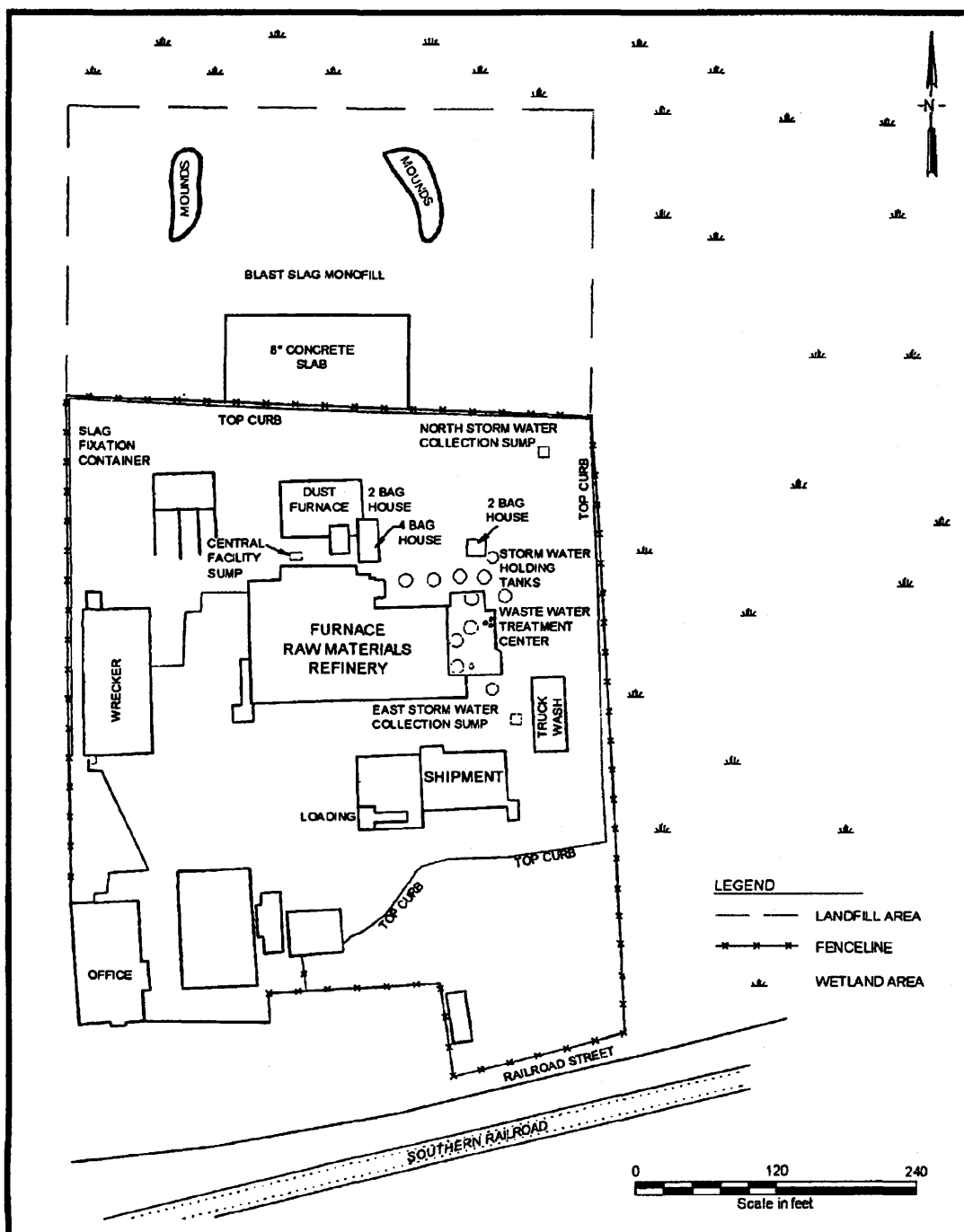
Upon receipt, batteries were stored on pallets located east and southeast of the facility; each pallet held about 50 batteries. The batteries were then conveyed to the wrecker building for the battery breaking operation. Wastewater generated from the battery breaking operations conducted inside the wrecker building was managed by an onsite wastewater treatment system. Water was used to separate lead from other battery components based on its density. After separation, the lead was transported to the blast furnace slag area, where the lead materials were passed through a smelter. According to facility representatives, 99 to 99.5 percent of the lead content was recovered. The molten lead product was then moved to the refinery area. The refinery area consisted of four kettles that received molten lead and formed ingots. The ingots were then moved to the finished storage area until they were shipped to customers.

Acid and sludge generated during the battery breaking operation contained residual amounts of lead and lead acid; the acid and sludge were transferred to the wastewater treatment unit to reclaim the remaining lead. The lead was reclaimed by allowing it to settle further in aboveground collection tanks. This lead sludge, collected prior to neutralization, was transferred to the blast furnace area and immediately fed into the furnace. The remaining acid was neutralized with liquid caustic soda. Upon neutralization, the solution was held for additional settling to precipitate dissolved metals. Sludge resulting from the neutralization process was also collected in settling tanks and recycled into the blast furnace with other lead scrap. The pH of the waste stream generated by the facility was further adjusted, and a sludge-free effluent was discharged to the Rossville Municipal Sewage Treatment Facility.

Several areas of the operating facility contained large volumes of lead-bearing materials. With the exception of the container storage area, the lead-bearing materials were not containerized; instead, they were placed on the asphalt foundation of the facility or directly on facility soils.

From 1979 until December 1988, blast slag that had accumulated as a part of the smelting process was disposed of in an onsite landfill. On November 3, 1986, RM submitted a petition for registration for an existing industrial landfill used to dispose of blast furnace slag; RM considered the slag a nonhazardous industrial waste. On November 8, 1988, RM submitted a Resource Conservation and Recovery Act (RCRA) Part B application stating that slag had been deposited on Site. Diagrams included in the application show slag piles both inside and outside of the area designated as the landfill. EPA's RCRA Compliance Section conducted a sampling investigation on December 7, 1988, to determine if the waste generated at the facility should be regulated. On December 20, 1988, the Tennessee Department of Health and Environment (TDHE) suspended all further processing of the request until results from the EPA sampling event could be assessed and the EPA could determine whether the blast slag was a nonhazardous waste (B&V 1996). Note: the TDHE is now named the Tennessee Department of Environment and Conservation (TDEC). Several references in the EPA files for the RM Site debate the status of blast slag as a hazardous waste. File material also indicates that on April 20, 1990, RM applied for a solid waste classification variance for the blast slag. RCRA also conducted a sampling investigation on May 9, 1990, to determine if smelting and landfiling activities at the facility were causing adverse environmental impacts. The variance was denied on June 6, 1990, because EPA determined that blast slag was a hazardous waste and subject to the full extent of





Ross Metals Site  
Rossville, Tennessee

**CDM**

Site Layout

Figure No.

2-2

05/02

RCRA regulations.

In September of 1990, RCRA issued a Complaint and Compliance Order against Ross Metals. After several months of extensive negotiations, the parties reached an agreement to settle the case. However, the company never signed the Consent Agreement, because of its precarious financial condition. In 1992, Ross Metals, Inc. received an Administrative Dissolution under the Articles of Incorporation. There is no known successor entity. Because of this, all State and Federal RCRA enforcement actions at the Site ceased.

Once negotiations failed with Ross Metals and all operations ceased at the facility, the Site was referred to EPA's Emergency Response and Removal Branch (ERRB). In a letter dated October 25, 1993, ERRB notified TDEC that the Site was eligible for a removal action. Prior to any ERRB clean-up activities, TDEC was approached by an interested third party, Greyhound Finance Services (GFS), regarding the possible clean-up of the Site. EPA and TDEC decided a State Lead RCRA Closure performed by GFS would be beneficial to all parties. An agreement concerning the RCRA Closure was never reached, therefore the Site was referred back to ERRB in June of 1994.

On June 15, 1994, ERRB conducted a site visit. Based upon ERRB's file review and site visit, the RM Site met the criteria for a high priority removal action. The removal action began in September 1994 and was completed in June 1995. The removal consisted of segregating, staging, or removing 46 wastestreams. The wastestreams, descriptions, and approximate volumes are listed in **Tables 2-1** and **2-2**.

Approximately 6,000 cubic yards (cy) of lead bearing blast slag was staged in onsite buildings. The removal action was completed in August 1995. During the removal action, EPA was also conducting a site investigation for the National Priorities List (NPL) listing process. In October 1996, the EPA North Site Management Branch began remedial investigations. The Site was listed on the final NPL on March 31, 1997.

An Engineering Evaluation/Cost Analysis (EE/CA) was finalized in February 1998. In considering the information presented in the EE/CA and the statutory limits which apply to non-time critical removal actions, EPA determined that a Remedial Investigation/Feasibility Study (RI/FS) Report that develops appropriate remedial action alternatives was needed for this Site.

The threat of human exposure and reports of trespassing caused EPA to perform a removal action in June and September of 1998. At that time, about 10,000 cy of slag were landfilled in an unlined and unsecured area located just north of the facility process area. About 6,000 cy of stockpiled lead slag material were stored at the facility inside deteriorating sheet metal buildings. The buildings were no longer providing protection from weather conditions because of deterioration. Data collected during the investigation revealed lead-contaminated surface soils (outside the fenced facility, approximately 8.58 acres). This area is adjacent to residential property and is located within a designated wetland. The removal action consisted of placing tarpaulins over the 6,000 cy of stockpiled lead slag and installing security fencing around the contaminated surface soils and landfill.

In November 1998 EPA issued an RI/FS Report for the Site by using the information provided in the EE/CA and other Site reports. Following completion of the RI/FS, EPA defined and issued a Record of Decision (ROD) for Operable Unit 1. OU #1 addresses approximately 10,000 cy of blast slag in an unlined landfill; 6,000 cy of blast slag stored in the on-Site buildings; 1,000 cy of buildings and equipment; 34,575 cy of contaminated soil; and 3,700 cy of pavement.

In June 1999, EPA issued Special Notice letters to approximately 30 parties who subsequently formed a steering committee. The steering committee was engaged in RD/RA negotiations with EPA until late 1999, at which time negotiations reached an impasse due to the passage of the Superfund Recycling Equity Act (SREA). The SREA exempts from liability those parties who arranged for the recycling of "recyclable material," including

On March 24<sup>th</sup>, 1998, EPA sent general notice letters to the Potentially Responsible Parties (PRPs).

<b>Table 2-1</b> <b>Non-Hazardous Waste Removed off Site</b>			
<b>Quantity Removed</b>	<b>Dates Removed</b>	<b>Type of Waste Removed</b>	<b>Type of Disposal Facility</b>
Not Applicable	9/26 - 10/10/94	battery cracking. equipment; ingot casting conveyor, baghouse blower, 17 cooling crucibles, battery saw, conveyor belt, tumbler and associated framework.	Reclamation Facility
230 cubic yards	10/3 - 12/20/94	construction-type debris	Landfill
2 each	10/21/94	baghouses	Reclamation Facility
371 gallons	10/25/94	diesel fuel	Reclamation Facility
Not Applicable	10/31/94	baghouse equipment: baghouse frame and associated duct work, screen	Reclamation Facility
850 cubic yards	11/05 - 11/18/94	conveyor, cross members, catwalk and ladder, scrap metal	Recycling Facility
88 containers	11/11/94	laboratory chemicals	Facility Local
20 cubic yards	11/30/94	old tires	High School Local
17 cubic yards	12/12/94	soda ash	Landfill Recycling Facility

<b>Table 2-2</b> <b>Hazardous Waste Removed off Site</b>			
<b>Quantity Removed</b>	<b>Dates Removed</b>	<b>Type of Waste Removed</b>	<b>Type of Disposal Facility</b>
250 cubic yards	11/14 - 11/15/94	battery chips/leaded debris	Regional treatment, storage, or disposal facility (TSDF)
34,430 lbs	12/02 - 12/12/94	leaded tank sludges ((D008, D006)	Local TSDF
288 cubic yards	12/08 - 12/19/94	leaded debris; debris, soil, floor dust, rags, PPE, cinderblocks (D008)	Regional TSDF
307,220 lbs	12/12 - 12/21/94	raw materials (K069, D008)	Reclamation Facility
330 gallons	12/16/94	base-neutral liquid	Local TSDF
330 gallons	12/16/94	motor oil	Local TSDF
90 gallons	12/16/94	hydrochloric acid	Local TSDF
110 gallons	12/16/94	sodium hydroxide	Local TSDF
3500 gallons	12/16/94	sodium hydroxide	Local TSDF

whole batteries.

As a result of SREA, EPA Region 4 has been performing a fund-lead Remedial Action on OU# 1 and a fund-lead RI/FS for OU# 2.

In December 2000, EPA initiated an RI/FS for OU #2 (groundwater). Analytical results from groundwater samples collected in the past revealed the presence of several inorganic compounds at concentrations that exceed the Safe Drinking Water Act Maximum Contaminant Level for Lead. However, much of the data is of questionable value because the turbidity of the samples did not meet the EPA Region 4 standard operating procedure goal of less than 10 nephelometric turbidity units (NTUs). This means that a clear and accurate assessment of the horizontal and vertical extent of groundwater contamination had not been obtained. The goal of the RI was to satisfy these objectives. Therefore, EPA conducted a second round of groundwater sampling in 2001. The final RI/FS report was completed in May 2002.

### **2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION**

Local officials have said that area residents have been fairly quiet about the presence of an NPL Site in the community. A Fayette County Health Department representative said they have received very few questions regarding health concerns.

A Fact Sheet was issued in January 1997, prior to a Public Availability Session, which was conducted by EPA and TDEC. The Availability Session was held on January 6, 1997; however, no citizens attended the meeting.

A fact sheet was released immediately after the Site was placed on the NPL. The Site was placed on the NPL on March 31, 1997.

The Agency for Toxic Substances and Disease Registry (ATSDR), after reviewing the available environmental data suggested that people were possibly exposed to metals in on-site and off-site surface soils and water. Therefore, ATSDR decided to conduct an Exposure Investigation (EI) to determine the lead level present in the soil of the adjacent residences and offered blood-lead level testing to the residents adjacent to the Site. The EI also included soil and dust testing for lead in residential areas. The EI investigated possible public health problems and developed plans for their control.

Following the issuance of notices to PRPs, EPA held an informational public meeting on April 14, 1998. During that meeting, citizens were encouraged to form a Community Advisory Group (CAG).

On April 21, 1998, ATSDR held a community meeting with residents of Railroad Street to explain the purpose of the EI. Prior to the community meeting, ATSDR distributed flyers throughout the community and coordinated media outreach with local newspapers in the area. In conjunction with the TDEC, ATSDR collected blood samples from identified residents, and soil and wipe samples from the homes on May 30, 1998.

The Rossville CAG, composed of approximately 10 citizens, met for the first time in May 1998. The CAG meets the first Tuesday of each month, as needed. Their mission statement is "The Rossville Community Advisory Group exists to insure that the cleanup of the Ross Metals Superfund Site protects human health and the environment."

A Proposed Plan Fact Sheet for OU# 1 was released to the public to describe EPA's preferred remedial alternative and invited public comments about the alternatives. The Administrative Record file was made available November 18, 1998. The file can be found at the information repository maintained at the EPA Docket Room in Region 4 and Rossville City Hall. The Notice of Availability of these two documents was published in the *Commercial Appeal* newspaper on November 18, 1998. A public comment period was held from November 18, 1998 to December 18, 1998. An extension to the public comment period was

requested. As a result, it was extended to January 19, 1998. In addition, a public meeting was held on November 30, 1998 to present the Proposed Plan to a broader community audiences than those that had already been involved at the Site. At this meeting, the TDEC answered questions about problems at the Site and the remedial alternatives. EPA also used this meeting to solicit a wider cross-section of community input on the reasonably anticipated future land use. Public comments were received during this period. A transcript of the public meeting is included in the Responsiveness Summary, which is part of this ROD.

A fact sheet was issued in January 2000 and public meeting was held in February of 2000. The purpose of the meeting was to update the community on the passage of the Superfund Recycling Equity Act of 1999 and its impact on the RM Site.

A Proposed Plan Fact Sheet for OU# 2 was released to the public on July 3, 2002. The Administrative Record file was made available July 22, 2002. The file can be found at the information repository maintained at the EPA Docket Room in Region 4 and Rossville City Hall. The Notice of Availability of these two documents was published in the Commercial Appeal newspaper prior to the public meeting. A public comment period was held from July 8, 2002 to August 7, 2002. In addition, a public meeting was held on July 18, 2002 to present the Proposed Plan to a broader community audiences than those that had already been involved at the Site. At this meeting, the EPA and TDEC staff answered questions about problems at the Site and the remedial alternatives. EPA also used this meeting to solicit a wider cross-section of community input on the reasonably anticipated future land use. Public comments were received during this period. A transcript of the public meeting is included in the Responsiveness Summary, which is part of this ROD.

## **2.4 SCOPE AND ROLE OF OPERABLE UNIT**

As with many Superfund sites, the problems at the Ross Metals Site are complex. As a result, EPA organized the work into two operable units (OUs). These are:

- OU #1: Contamination in the source materials (approximately 10,000 cy of blast slag in an unlined landfill; 6,000 cy of blast slag stored in the on-Site buildings; 1,000 cy of buildings and equipment; 34,575 cy of contaminated soil; and 3,700 cy of pavement)
- OU #2: Contamination in groundwater

EPA has already selected the remedy for OU #1 in a Record of Decision (ROD) signed on April 2, 1999. OU #1 will address source material (soil, sediment, waste, pavement, and debris) contaminated with lead through treatment and off-Site disposal of principal and low-level threat wastes. This action is currently in the Remedial Action stage.

The second operable unit, the subject of this ROD, addresses the contamination in the groundwater. Ingestion of water extracted from this aquifer poses a future risk to human health because EPA's acceptable risk range is exceeded and concentrations of lead are greater than the Maximum Contaminant Level for drinking water (as specified in the Safe Drinking Water Act). This second operable unit presents the final response action for this Site.

## **2.5 SITE CHARACTERISTICS**

### **2.5.1 Land Use**

The area surrounding the Site is primarily rural or residential. A municipal wastewater treatment plant is located adjacent to the western Site boundary and a Kellogg's food production facility is located to the South. The towns of Rossville, Rossville Junction, and New Bethel are located within a 4-mile radius of the Site; the total population within the 4-mile radius is 1,947. The nearest school is located 0.3 miles southeast of the Site.

### 2.5.2 Climatology

The RM Site is located in southwest Tennessee, about 30 miles west of Memphis. This area has an average annual daily temperature of about 62.3°F. The normal daily minimum and maximum temperatures are 52.4°F and 72.1°F, respectively. Annual precipitation is 52.10 inches. (Source: National Weather Service Historic Data for Memphis, 1961-1990).

### 2.5.3 Physiography

The RM Site is located in the Gulf Coast Plain Physiographic Province of western Tennessee, which is characterized by unconsolidated near-surface sands, silts, and clays. Elevations within the surrounding area vary from 290 to 470 feet National Geodetic Vertical Datum (NGVD) (USGS 1965). Ground elevations within the Site boundaries range from about 315 NGVD near the main office building to about 310 NGVD at the northeast corner of the fenced portion of the Site. The RM Site is located about 0.5 miles south of the Wolf River.

*Note: The following Site description predates building demolition and excavation activities that have been conducted as part of the OU #1 remedy. Through August 2002, all buildings, except those that contained slag stockpiled from previous work and the office, have been demolished. All excavations outside of the plant area are complete and approximately 22,000 cy of material are currently stockpiled in the northeast part of the Site. This material is covered with a synthetic liner.*

The RM Site consists of an old fenced facility area enclosing about 5.5 acres, a blast slag landfill covering about 2.5 acres north of the old fenced area, and contaminated wetlands located north and east of the facility and landfill areas. Total area is approximately 8.58 acres. The fenced area includes several buildings, most of which are constructed of sheet metal. Most of the area inside the fenced facility area is paved with either concrete or asphalt, and an asphalt curb is located just inside the fence. The curb was apparently constructed to divert storm water runoff to the storm water collection sump in the northeast corner of the property. Several stockpiles of waste slag are located in various buildings, including the wrecker building, the slag fixation container, the furnace raw materials refinery building, and the shipment building. The buildings are generally in poor condition, and some are in danger of collapsing.

The landfill area was constructed in a wetland area north of the fenced area. Several soil-covered mounds ranging up to 6 feet high are located in the landfill area. An 8-inch-thick concrete slab is located just north of the gate in the landfill area; however, evidence suggests that some slag may be buried beneath the concrete slab. An estimated 10,000 cy of slag is buried throughout the landfill at thicknesses of up to about 4 feet. About 1 to 2 feet of fill material has been placed over the slag throughout the landfill.

### 2.5.4 Surface Water

Storm water runoff from the entire facility drains into a basin located at the northeastern corner of the fenced facility. The basin discharged to a small wetland area located north and northeast of the facility area. During an inspection on October 14, 1993, the holding dike of the storm water basin was observed to be overflowing, and storm water was apparently not being collected in on-Site storage tanks for wastewater treatment. Runoff from the landfill also drained to the wetland located north and northeast of the landfill; in addition, the landfill has no documented run-on, run-off, or collection facilities. The landfill is documented to lie adjacent to a wetland area; however, the wetlands are not delineated on the National Wetland Inventory (NWI) map. Due to its small size (3 to 5 acres), the wetland was determined to be too small for delineation on typical NWI maps.

The wetlands and wooded area extend to the north and ultimately drain to the Wolf River,

which is the main drainage body for the region. The Wolf River flows west, through Memphis, and into the Mississippi River.

The Rossville municipal wastewater treatment plant is located west of the RM Site. The outfall for the treatment plant is located on the Wolf River at the Highway 194 bridge, about 1.5 miles upstream of the facility. The outfall and the treatment plant are not expected to have any adverse effect on the wetland located north and northeast of the Site.

As indicated on **Figure 2-3**, the RM facility and the wetlands north and east of the facility are located in a 100-year floodplain. **Figure 2-4** illustrates the type of wetlands that are part of the RM Site.

#### **2.5.5 Geology and Hydrogeology**

The Site is located in the Gulf Coast Plain Physiographic Province of Western Tennessee, which is characterized by unconsolidated near-surface sands, silts, and clays. Included in this sequence of unconsolidated sediments is the Memphis Sand, which contains an important water-bearing zone known as the Memphis aquifer. The Memphis Sand consists of a thick body of sand that contains clay and silt lenses or beds at various horizons. The sand ranges from very fine to very coarse (B&V 1996). A regional cross-section is provided as **Figure 2-5**.

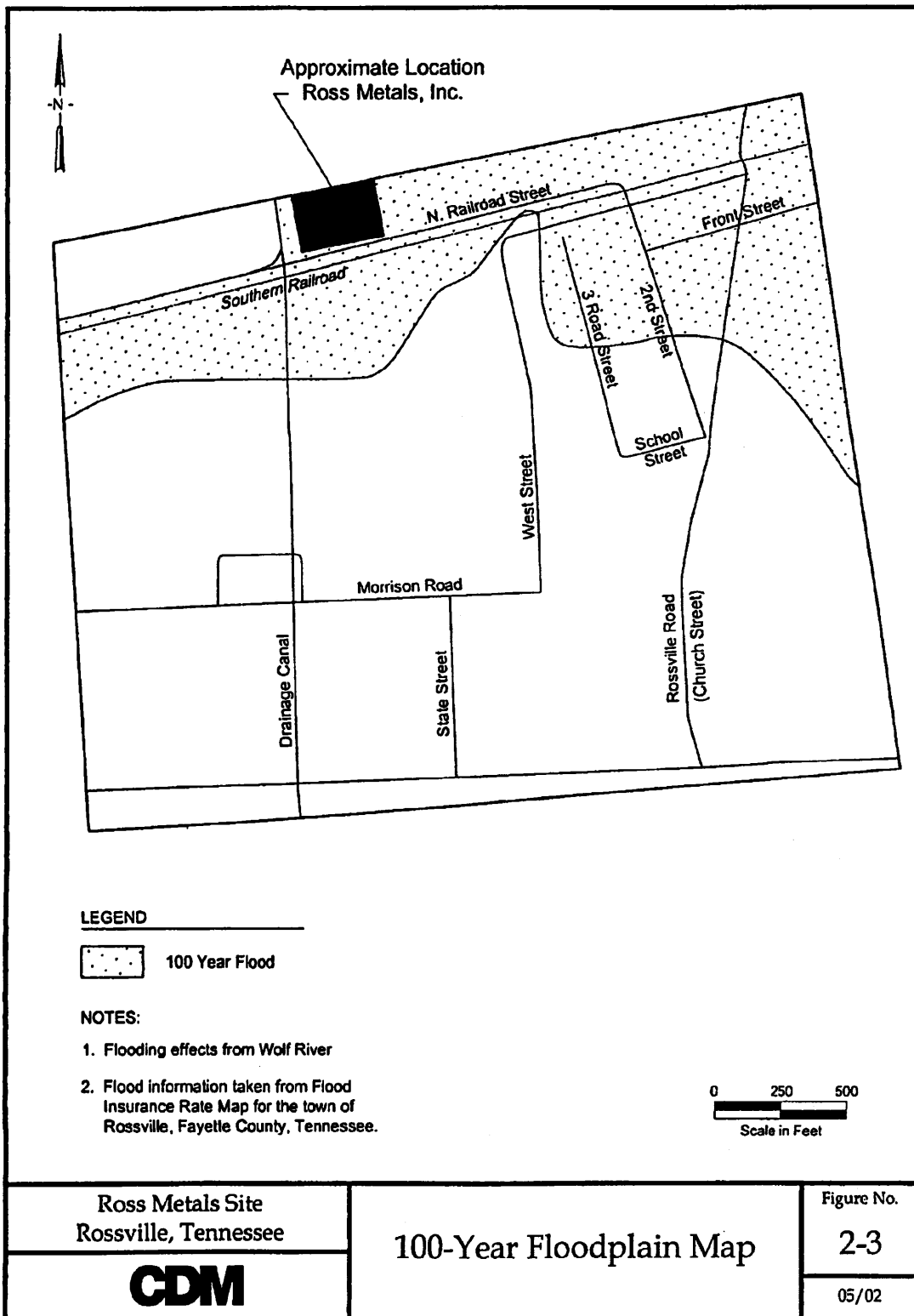
Recharge of the Memphis aquifer generally occurs along the outcrop of the Memphis Sand. Recharge results from precipitation and from downward infiltration of water from the overlying fluvial deposits and alluvium, where present. In the outcrop-recharge belt, the Memphis aquifer is under water-table conditions (unconfined), and the configuration of the potentiometric surface is complex and generally conforms to the topography. West of the outcrop-recharge belt, the aquifer is confined by other members of the Claiborne Group containing clay, silt, sand, and lignite.

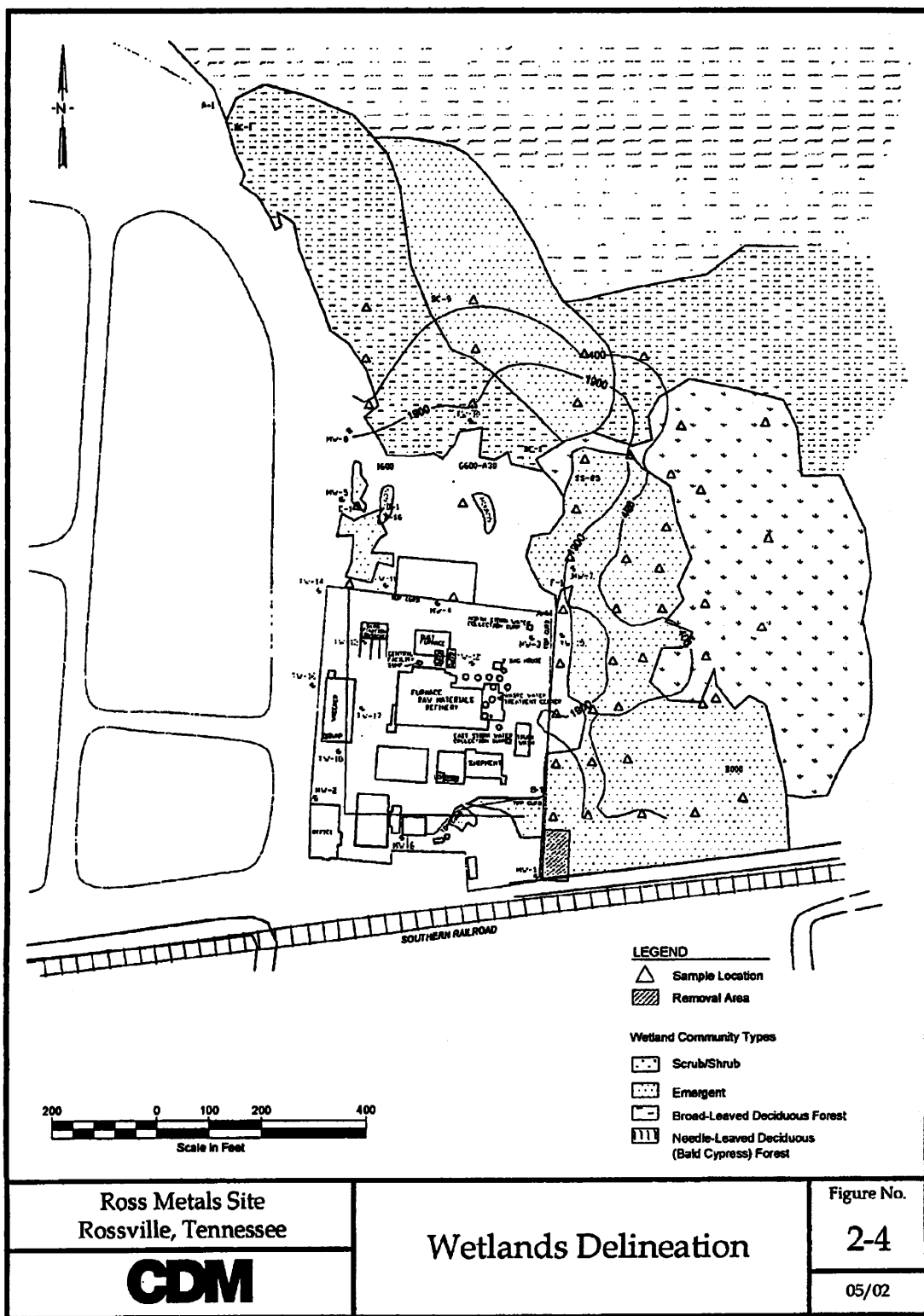
Groundwater in the unconfined portion of the Memphis aquifer typically flows to the west. Transmissivities of the Memphis aquifer in the Memphis area generally range from about 20,000 to 42,800 square feet per day. However, USGS literature referenced only one test conducted in Fayette County (the location of the RM facility); the test indicated a transmissivity of only 2,700 square feet per day (B&V 1996). Two municipal supply wells and three industrial production wells are located within 0.75 mile of the Site and are screened in the Memphis aquifer.

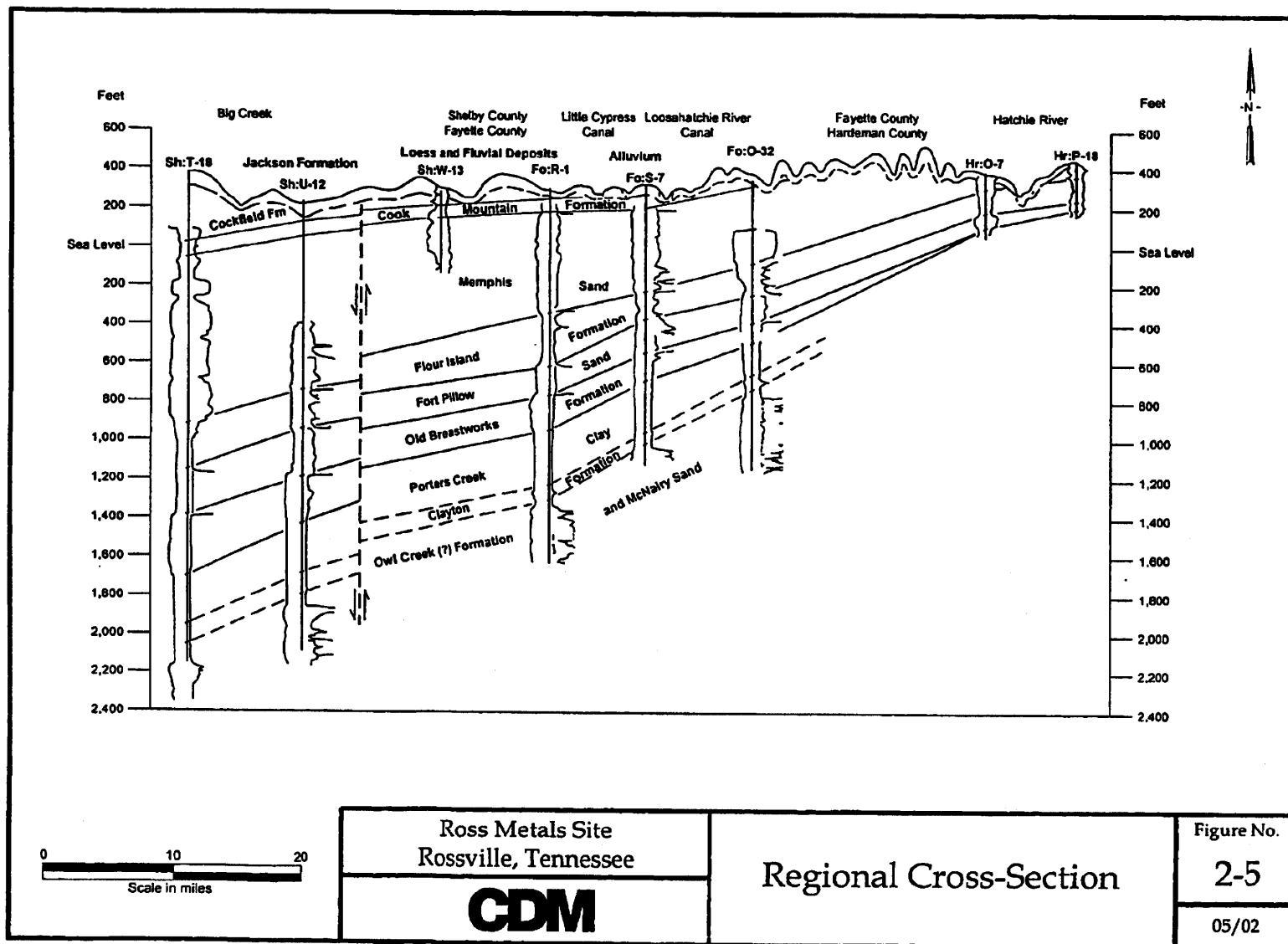
The RM facility was constructed in part of a wetland; RM reportedly spread and compacted several feet of clay prior to constructing the facility. A 1987 memorandum written by the State of Tennessee indicates that clayey silt was present in the area of the industrial landfill before its construction; the clayey silt was present from 0 to 3 feet, and a silty clay was present from about 3 to 7 feet.

In May 1988, five monitoring wells were installed by RM's contractor. The borings for the monitoring wells indicated the presence of about 11 feet of silty clay and clayey silt overlying sands of the Memphis Sand aquifer. In May 1997, eight additional monitoring wells were installed at the Site. A soil boring (T-4) was also drilled in the southwest corner of the Site, but it was not completed as a monitoring well. Monitoring well depths ranged from 23 to 28 feet below ground surface (bgs).

Soil samples collected during soil boring activities revealed that Site stratigraphy generally conformed to the May 1988 data collected by the RM contractor. The predominant soil type observed in surficial to shallow soil intervals (within 10 feet bgs) consists of gray, mottled, dry to moist clay. The clay unit contains a high percentage of silt (except in the western portion of the Site, where it grades to sandy clay); exhibits low plasticity and variable organic content; and occasionally exhibits a brown to tan coloration. The clay unit extends from ground surface to depths ranging from 7 to 20 feet bgs and is generally thickest in the western portion of the Site.







Sands encountered at the Site are fine-grained and grayish-white in color. Sands are generally well sorted and exhibit a fine to medium texture with occasional clay lenses and very little silt. Sand textures generally coarsen with increasing depth, becoming medium to coarse in texture below 20 feet bgs. A trend toward a decrease in the degree of sorting and an increase in the coarse sand fraction was also observed in samples collected from below 20 feet bgs.

Groundwater at the Site is encountered in the upper portion of the sand section. The aquifer possesses a degree of hydrologic confinement due to the pervasive upper clay section, and water levels in Site monitoring wells rise above the base of the clay unit.

Information collected during the 1988 and 1997 investigations conducted by the RM contractor and PRC, respectively, conflict somewhat with a Tennessee memorandum written in 1987 concerning the actual depth of clay beneath the Site. However, it can be assumed that at least 7 feet of silty clay and clayey silt are present directly under the Site; it remains undetermined how much, if any, of it is native material. Some of the clay may be part of the base of the Cook Mountain Formation or a clay lens within the upper part of the Memphis Sand. Occurrences of the overlying members of the Claiborne Group in the area of the Site may be thin or absent above the Memphis Sand. **Figures 2-6 and 2-7** present cross-section information obtained from the EPA Site investigations. Additional cross-sections were prepared using boring logs from monitor wells constructed in 1997. The 1997 boring cross-section locations are illustrated on **Figure 2-8**. The 1997 cross-sections are presented on **Figures 2-9 and 2-10**.

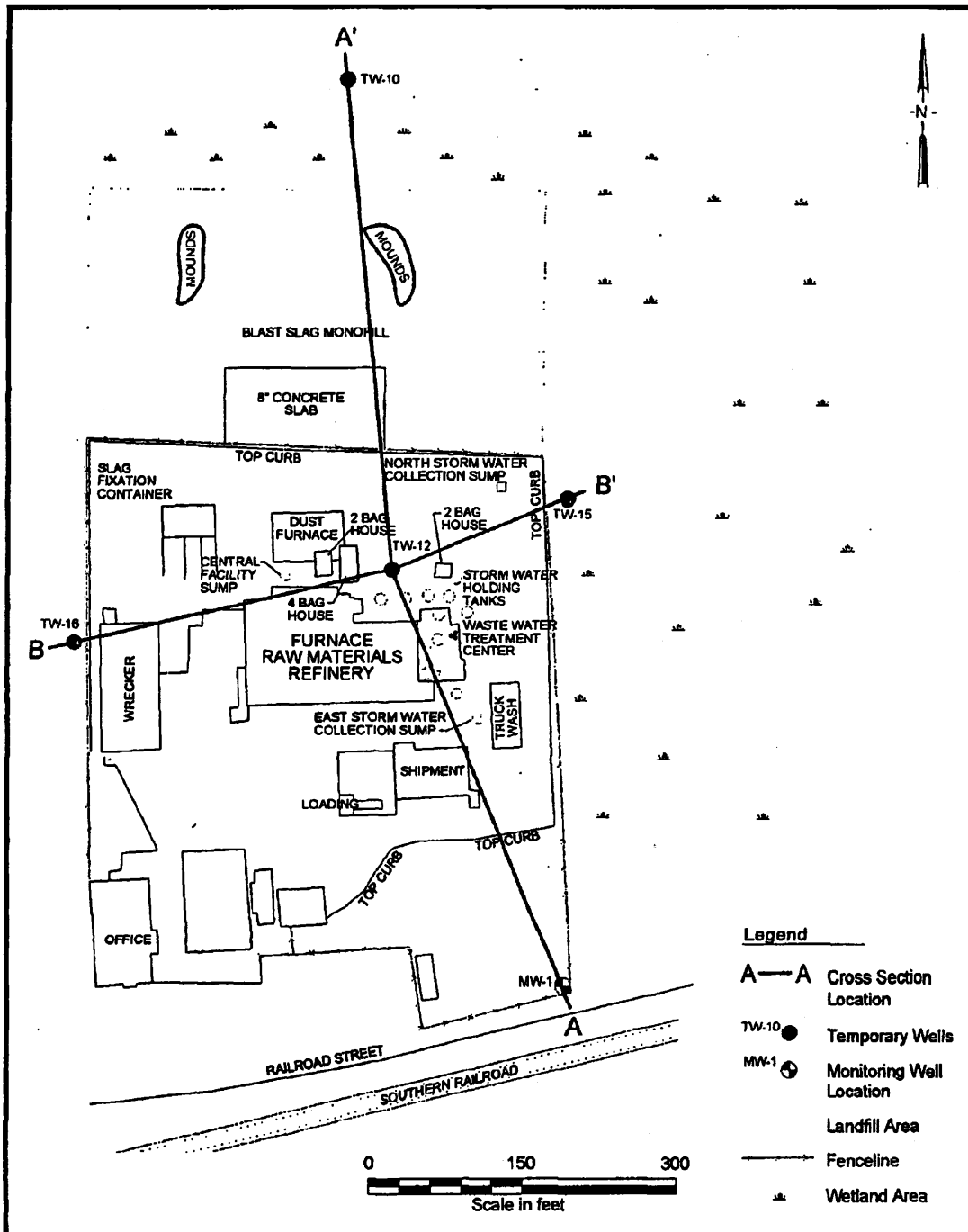
Regional groundwater generally flows to the west; however, measurements collected from the Site monitoring wells in 1990 indicate that shallow groundwater movement is north towards the Wolf River, and measurements collected from the Site monitoring wells in 1996 suggest a more northwesterly movement of groundwater. Groundwater levels measured in March 2001, May 2001, and January 2002 indicate the direction of groundwater movement at the Site is predominantly toward the north in the southern part of the Site. The direction of groundwater movement is predominantly northwest in the northern part of the Site. These findings corroborate the conclusions made in the 1996 study and conflict somewhat with the 1990 study which concluded that the direction was predominantly north throughout the Site. It should be noted that slight temporal variations may occur. Water level contours based on the March 2001, May 2001, and January 2002 water level measurements are shown in **Figures 2-11, 2-12, and 2-13**, respectively.

## **2.56 Pre-1999 Groundwater Investigations**

Groundwater has been investigated at this Site since 1990 with the installation of 21 permanent monitoring wells and numerous temporary monitoring wells over this time period. The monitoring wells at the Site typically were constructed with 10 foot well screens and terminate at approximately 20 to 30 feet bgs, but a few were installed deeper.

Analytical results of groundwater samples collected prior to 1999 revealed the presence of several inorganic compounds at concentrations that either exceed the Safe Drinking Water Act primary or secondary drinking water standards. Aluminum, arsenic, cadmium, lead, manganese, and nickel were detected above respective guidance concentrations. Lead, however, has been the most pervasive contaminant found in groundwater. Lead concentrations in unfiltered groundwater samples collected prior to 1999 ranged from non-detectable to 1,600 ug/L, while lead concentrations in filtered groundwater samples ranged from non-detectable to 770 ug/L. The EPA action level for lead in groundwater is 15 ug/L. The groundwater sample locations and results for sampling conducted prior to 1999 are illustrated in **Figure 2-14**.

As illustrated in **Figure 2-14**, numerous groundwater samples were collected and analyzed prior to 1999. Unfortunately, there is some question as to the reliability of this groundwater data with respect to representing actual groundwater conditions at the Site. EPA Region 4 policy is to use only unfiltered sample results for risk assessment and for determining extent of contamination. Thus, the filtered sample data, while providing some



Ross Metals Site  
Rossville, Tennessee

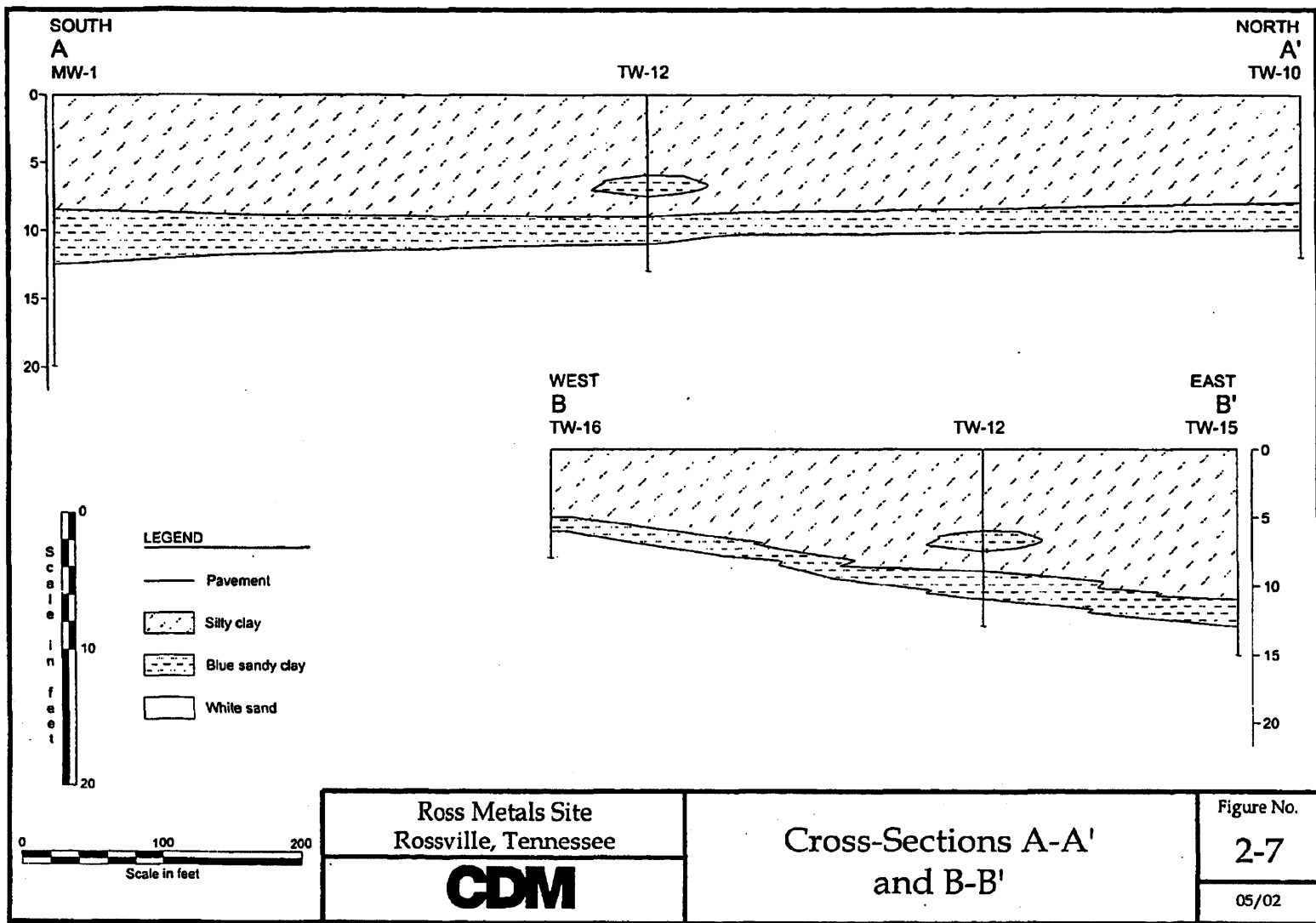
**CDM**

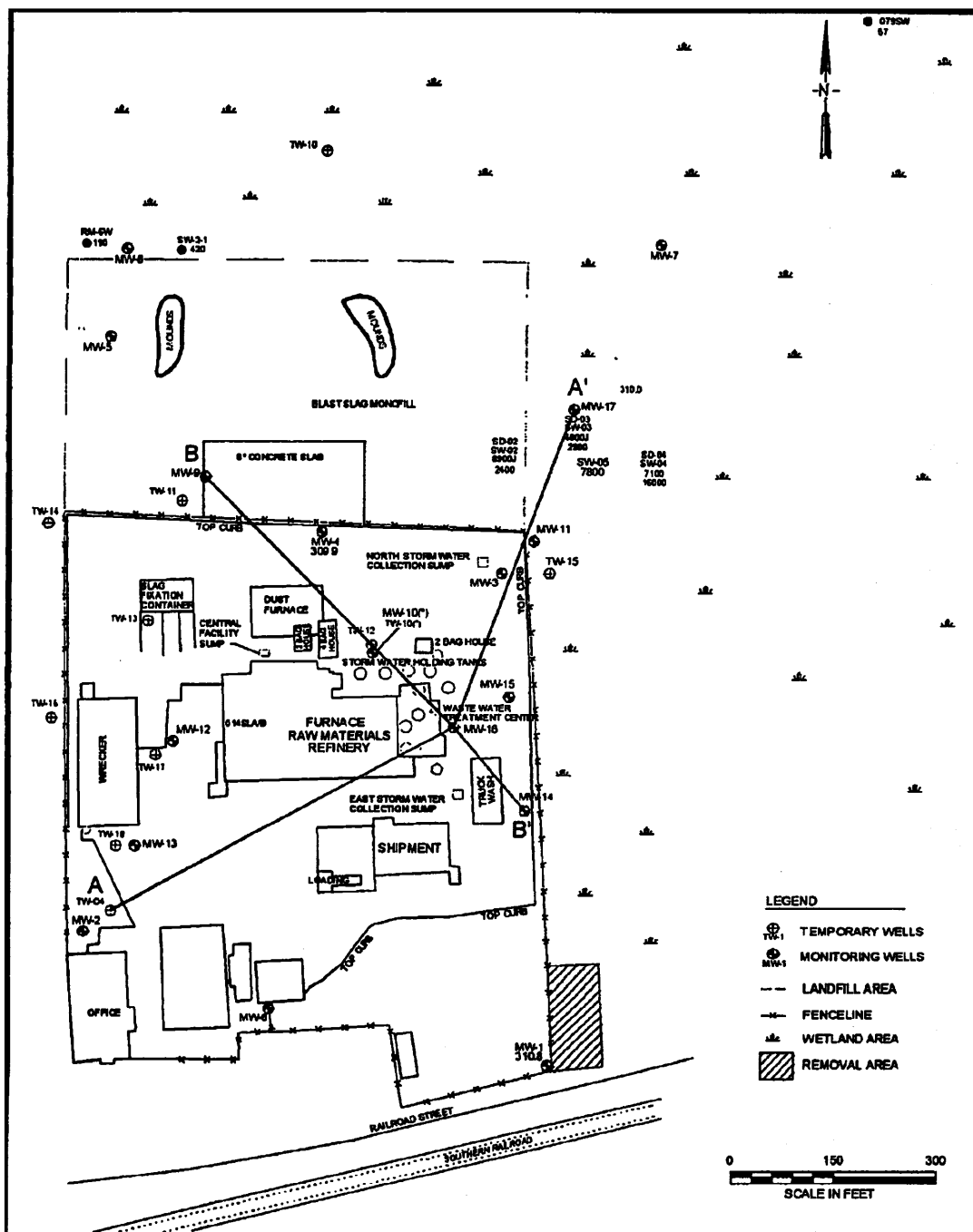
Cross-Section Locations

Figure No.

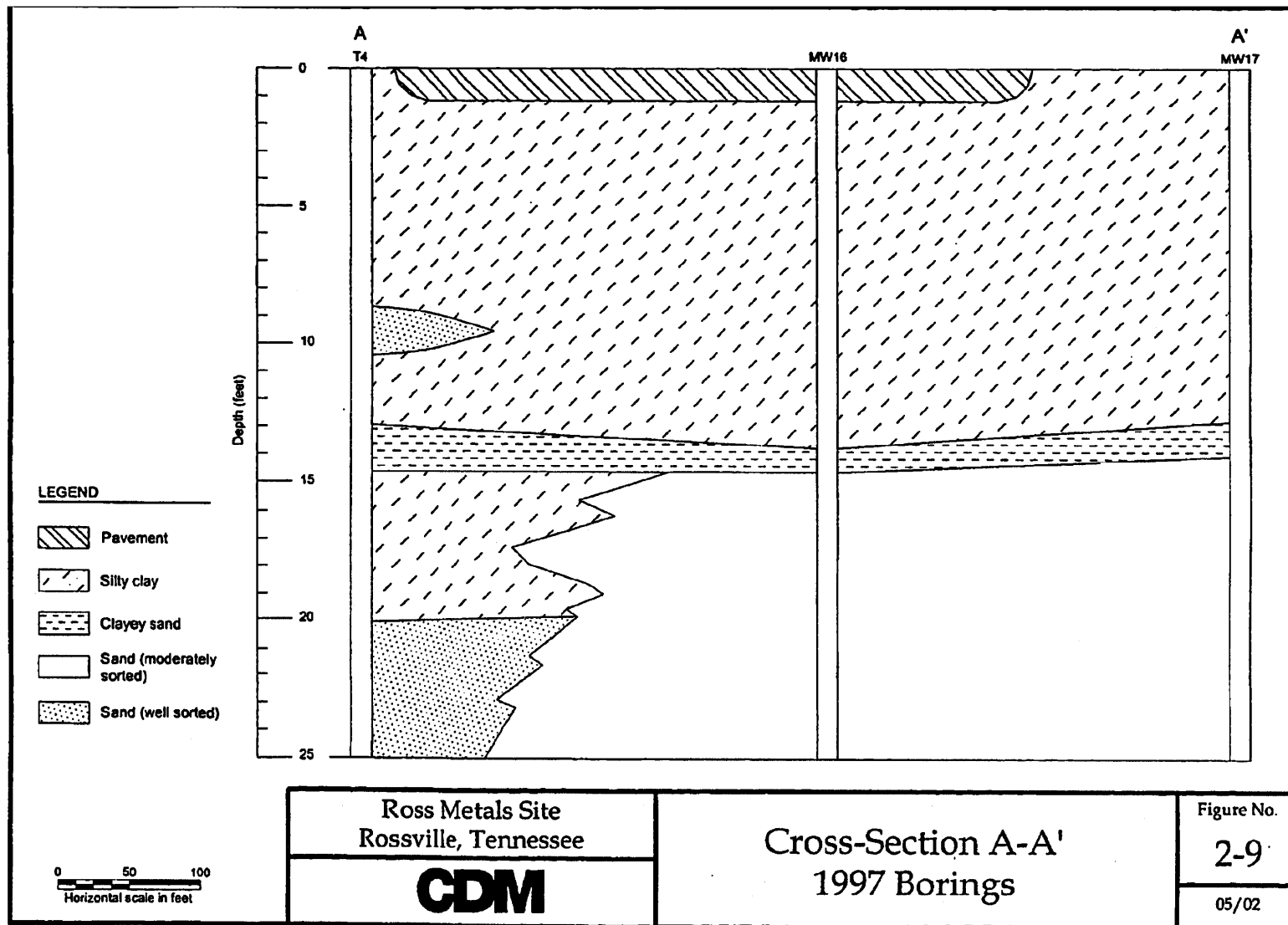
2-6

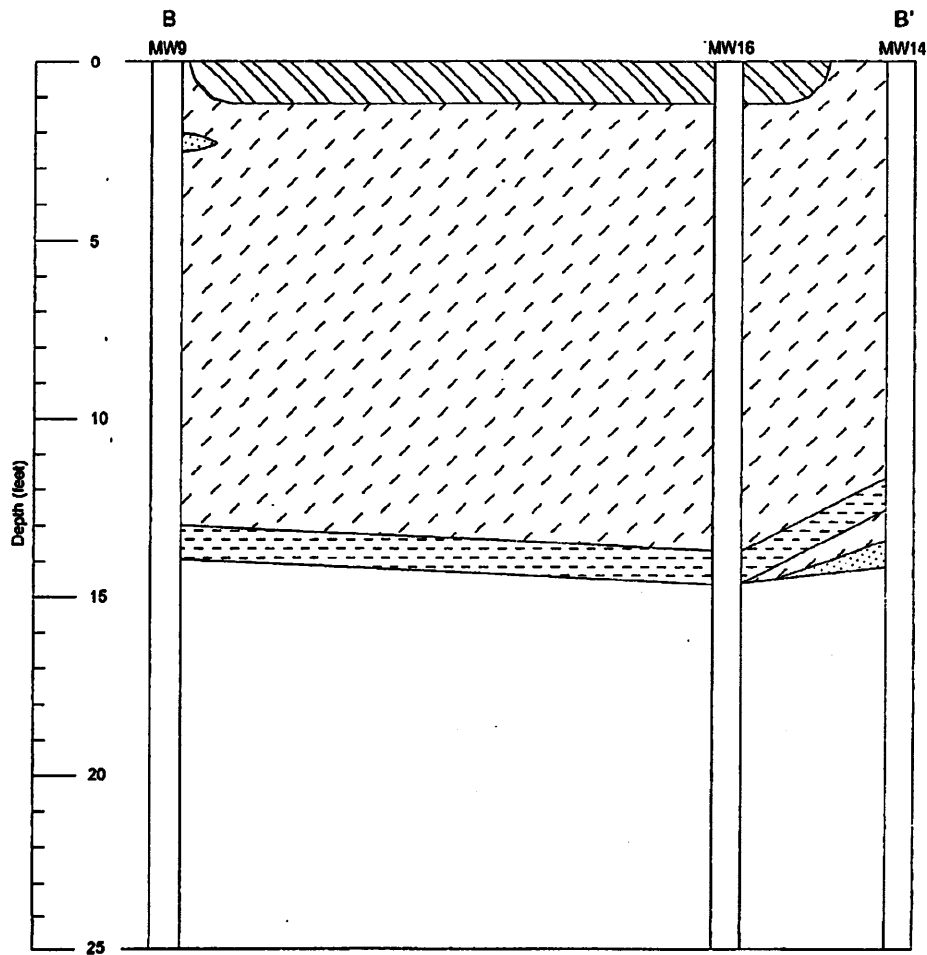
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<p>Ross Metals Site Rossville, Tennessee</p>	<p>Cross-Section Locations 1997 Borings</p>	<p>Figure No. 2-8</p>
<p><b>CDM</b></p>		<p>05/02</p>





**LEGEND**

- |   |             |   |                          |
|---|-------------|---|--------------------------|
|  | Pavement    |  | Sand (moderately sorted) |
|  | Silty clay  |  | Organic layer            |
|  | Clayey sand |   |                          |

0 50 100  
Horizontal scale in feet

Ross Metals Site  
Rossville, Tennessee

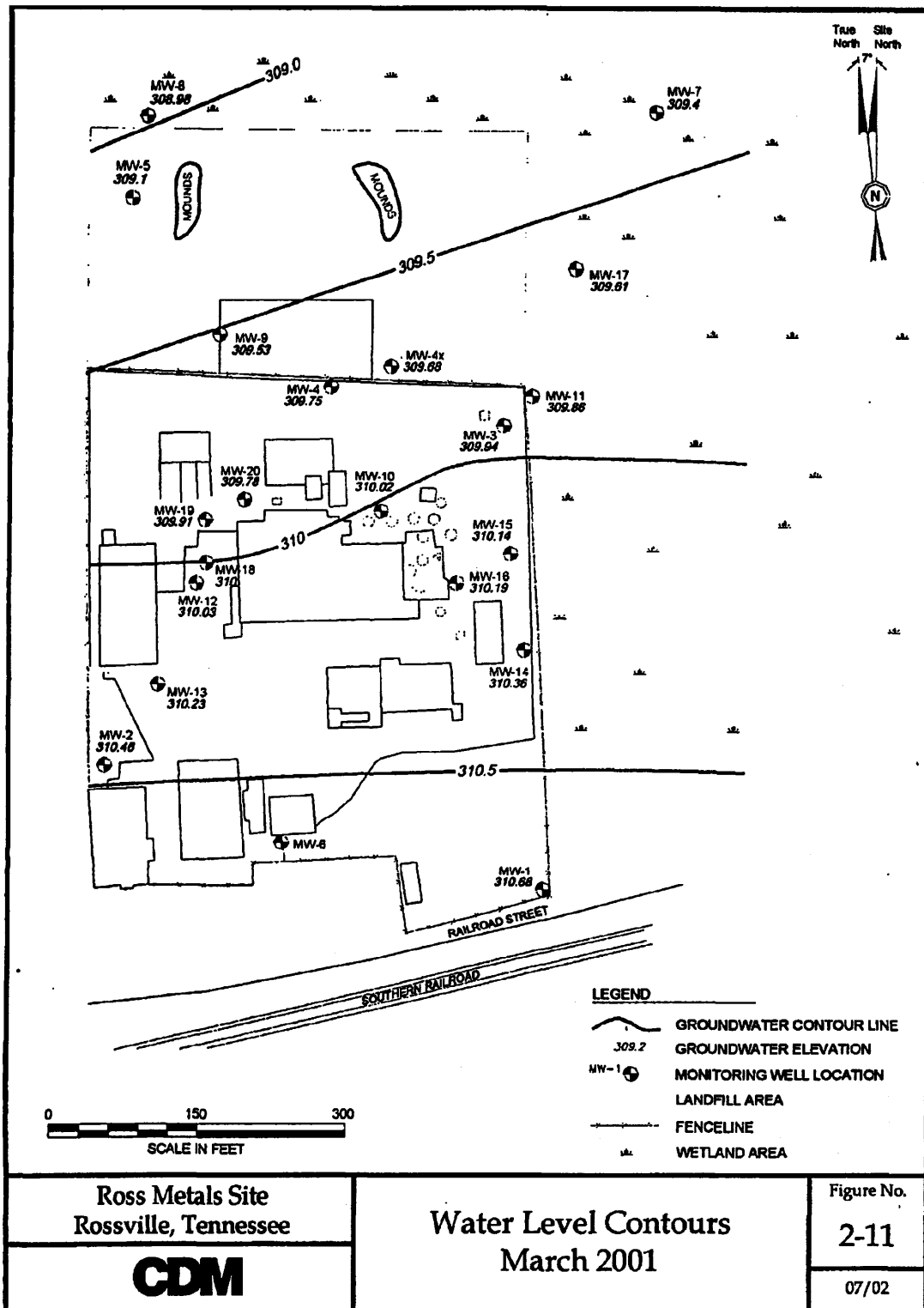
**CDM**

Cross-Section B-B'  
1997 Borings

Figure No.

2-10

05/02



Ross Metals Site  
Rossville, Tennessee

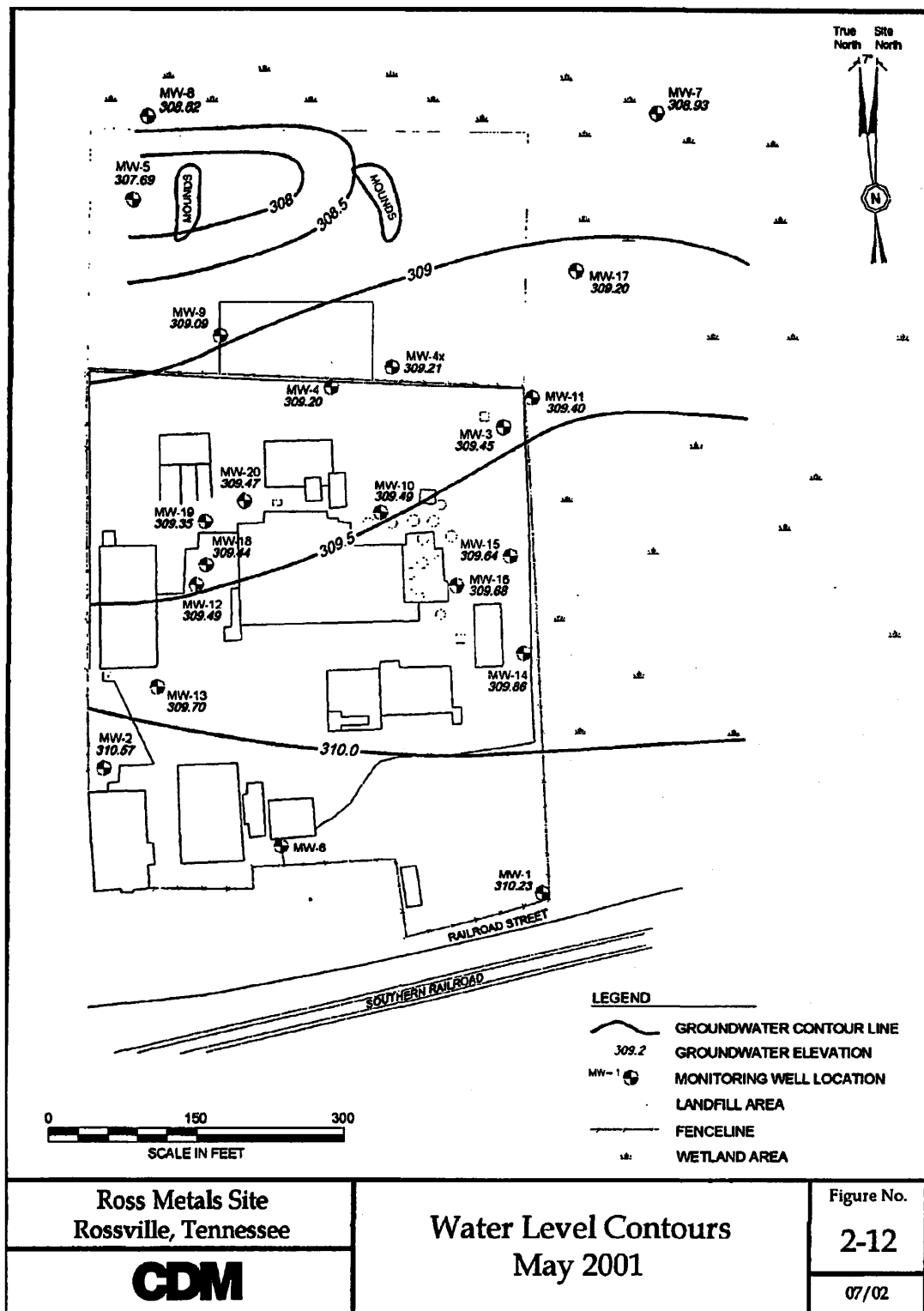
**CDM**

Water Level Contours  
March 2001

Figure No.

2-11

07/02



Ross Metals Site  
Rossville, Tennessee

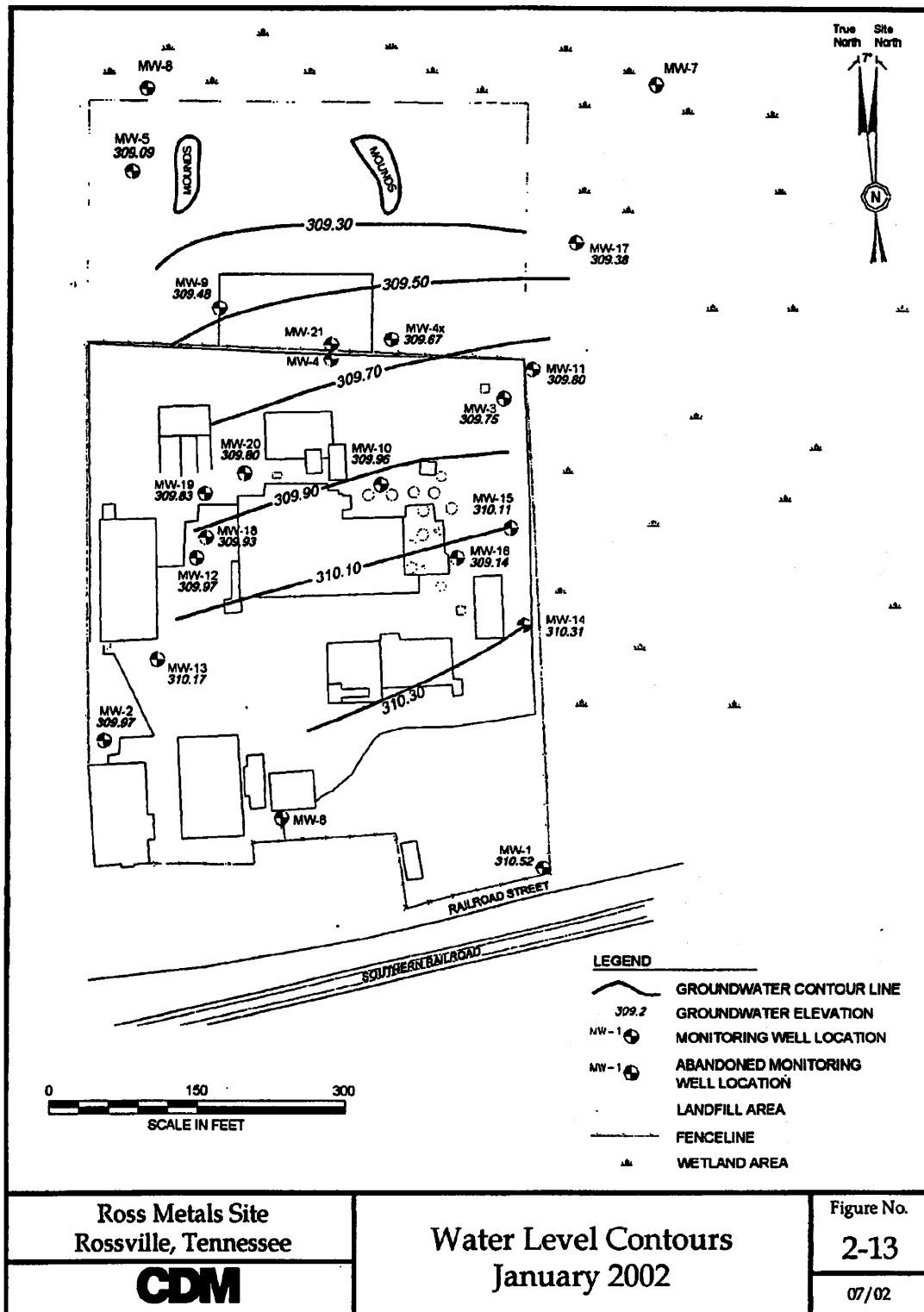
**CDM**

Water Level Contours  
May 2001

Figure No.

2-12

07/02



Ross Metals Site  
Rossville, Tennessee

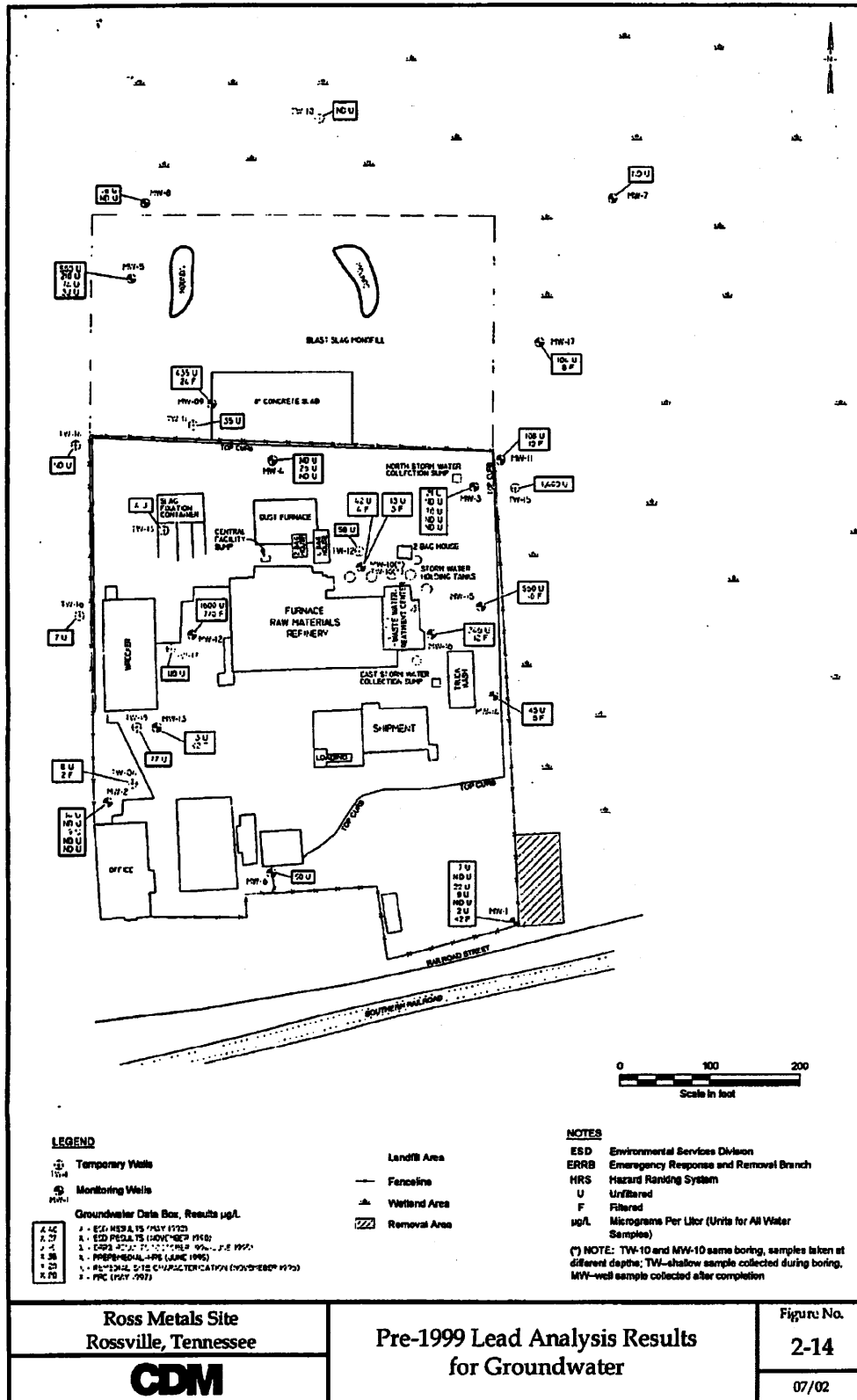
**CDM**

Water Level Contours  
January 2002

Figure No.

2-13

07/02



clue as to the actual magnitude and extent of contamination, cannot be used for these purposes. On the other hand, the unfiltered sample data is suspect due to the fact that the turbidity of the samples typically exceeded the EPA Region 4 Standard Operating Procedure goal of 10 NTU.

#### **2.5.7 Groundwater Investigations: 1999 and Later**

Investigations conducted by EPA's Region 4 Science and Ecosystem Support Division (SESD) in 1999 and by CDM, under contract to EPA, in 2001 and 2002 provide the most reliable assessment of groundwater contamination. SESD conducted two rounds of groundwater sampling in 1999 using a sampling technique that produced samples with low turbidity. Samples were analyzed for Target Analyte List (TAL) metals using the trace inductively coupled plasma (ICP) method. Compared to more turbid samples obtained previously, these results showed that lead contamination in groundwater was reasonably well defined. The most significant finding of the first round of sampling was the presence of lead at 69 ug/L in MW-4, greater than the Safe Drinking Water Act (SDWA) action level of 15 ug/L. Overall, lead was found in 6 of 20 wells. Excluding MW-4, concentrations ranged from 2.1 to 4.8 ug/L. The most significant finding of the second round of sampling was the presence of lead at 110 ug/L in MW-4. Overall, lead was found in 5 of 20 wells. Excluding MW-4, concentrations ranged from 1.4 to 12 ug/L.

CDM's scope of services was limited to (1) the collection of additional groundwater samples from the existing monitoring wells to verify the results of the 1999 sample analyses; (2) the surveying of all the existing monitoring wells and the collection of water level measurements to develop a more accurate and current water level contour map for the Site (see Section 2.5.5); and (3) the abandonment of MW-4 and the installation of a replacement well.

CDM collected groundwater samples in March and May 2001 and January 2002. In March 2001, samples were analyzed for TAL metals using the trace ICP method. Separate analyses for arsenic and lead were performed using the inductively coupled plasma mass spectrometer (ICPMS) method. The most significant finding was the presence of lead at 57 ug/L (trace ICP) and 82 ug/L (ICPMS) in MW-4. Overall, lead was detected in 9 of 20 locations. Excluding MW-4, concentrations ranged from 1.0 ug/L to 13 ug/L.

CDM re-sampled MW-4 in May 2001 to confirm the March 2001 results. Duplicate groundwater samples were collected and analyzed for lead by the ICPMS method at two laboratories. The results show concentrations of 80 ug/L and 81 ug/L for lead at one laboratory and 85 and 86 ug/L lead at the other laboratory. These results are very similar and confirm the existence of lead in the groundwater at monitoring well MW-4.

Based on an evaluation of the historical data for monitoring well MW-4 and the fact that the surface pad for this well had been damaged, EPA decided that a replacement monitoring well should be installed near the MW-4 location. CDM oversaw the abandonment of MW-4 and the installation of a replacement well about 15 feet north of MW-4. The new well, designated MW-21, was drilled and constructed to 22 feet bgs.

CDM collected groundwater samples in January 2002 from select monitoring wells. These samples were analyzed for lead only by the EPA Region 4 SESD laboratory using the ICPMS method. The most significant finding was the presence of lead at 67 ug/L in MW-21 and at 21 ug/L in MW-19.

Overall, lead was detected in 7 of the 9 locations sampled. Excluding MW-19 and MW-21, detected concentrations ranged from 0.32 ug/L to 4.9 ug/L.

#### **2.5.8 Nature and Extent of Contamination**

The data collected during this RI (combined with the knowledge gained from the data collected in 1996 and 1997) indicate that both the nature and the extent of Site-related groundwater contamination at this Site are very limited. The nature of Site-related

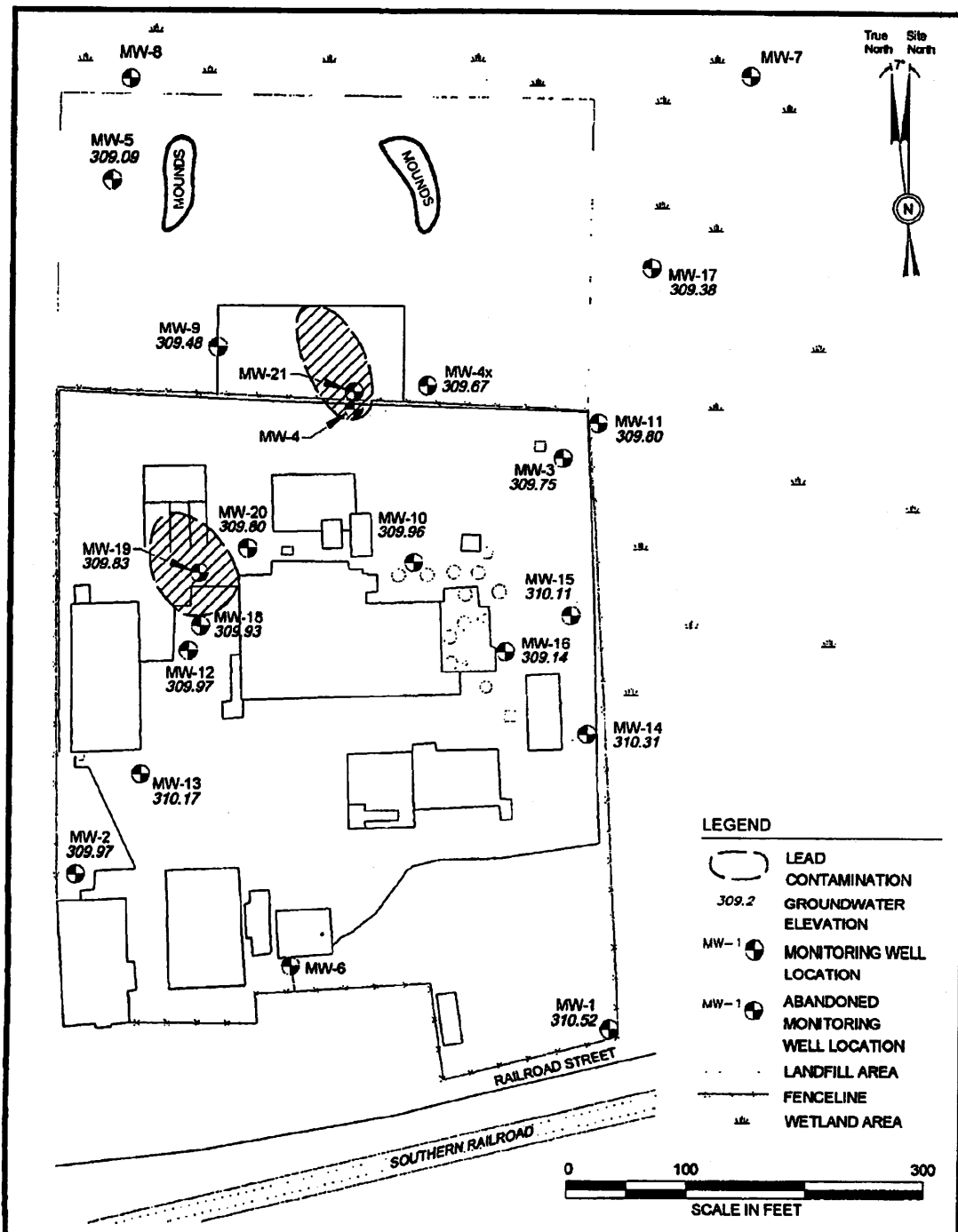
groundwater contamination is limited primarily to lead. While it's true that a few other inorganics (i.e., manganese and iron) were found at significantly elevated concentrations in spot locations, these inorganics form no general pattern, were not included in the facility smelting activities, were only found at significant concentrations in monitoring wells where significant lead contamination (the primary Site-related contaminant) was not found, are common naturally occurring contaminants, and were also found at significant concentrations in a monitoring well (MW-2) located upgradient of all the known Site source areas. Hence, the iron and manganese contamination found at the Site is considered to be a product of nature and not Site-related activities.

The horizontal extent of Site-related groundwater contamination appears to be limited primarily to the area around MW-4/MW-21 and MW-19 (see **Figure 2-15**), as these were the only monitoring wells which had lead concentrations significantly above background. Background concentrations of lead appear to be within the range of 0 to 5 ug/L. Note that while the results of downgradient monitoring wells MW-5 and MW-8 provide an absolute boundary for the horizontal extent of lead contamination in groundwater at the Site, as indicated in Figure 2-15, these monitoring wells are likely located well beyond the actual lead plume boundaries. While there are no monitoring wells located immediately downgradient of MW-4/MW-21 and MW-19 to verify this conclusion, for the reason discussed below, it is highly unlikely that the extent of the lead plume is significantly greater than what is shown in Figure 2-15.

As discussed in Section 2.5.8 (Contaminant Fate and Transport Analysis), under normal pH conditions (as are present throughout at the RM Site) lead is a very highly sorptive metal, so much so, that horizontal transport of lead in an aquifer is usually found to be insignificant. Lead plumes under normal pH conditions are usually found to exist only where there is a source directly above it, and if this source is removed, the plume will likely disappear as the remaining lead becomes sorbed to the soil matrix. Thus, it is unlikely that the lead plumes at the RM Site have migrated significantly beyond their source areas. However, even if the plume boundaries do extend as far downgradient as MW-5 and MW-8, while such minor adjustments in plume boundaries may affect the details of a remedial design, the determination of risk and the evaluation and selection of a remedial action alternative should not be affected.

The estimated vertical extent of lead contamination at the Site is shown in the conceptualized cross-section provided in **Figure 2-16**. While there is no deep monitoring well paired with MW-19, the results from deep monitoring wells MW-18 and MW-20 located nearby suggest that the vertical extent of lead contamination in the vicinity of MW-19 is limited to the upper part of the aquifer. However, because there are no deep monitoring wells located anywhere near the area of MW-4/MW-21, the vertical extent of the lead plume in this area is uncertain. It should be noted, however, that the aquifer is generally less than 50 feet thick. The top of the aquifer is approximately 10 feet bgs and the bottom of the aquifer is approximately 45 to 60 feet bgs. With a 10-foot well screen, each monitoring well thus covers at least 20 percent of the thickness of the aquifer. MW-4 is screened from about 9 to 19 feet bgs and MW-21 is screened from 12 to 22 feet bgs, but most of the monitoring wells at the Site are screened from about 15 to 25 feet bgs and there are many that extend down to about 30 feet bgs, all of which were found to have lead concentrations within the background range during this RI. Combine all the analytical results for monitoring wells screened in the middle part of the aquifer with the analytical results from MW-18 and MW-20 (the only existing deep monitoring wells at the Site) and the evidence is strong that no lead contamination, including that found at MW-4/MW-21, has migrated vertically in the aquifer to any significant depth. This is the result that would be expected because of the low transport properties of lead.

The results of this RI indicate that, for the most part, the clay aquitard overlying the Memphis aquifer at the Site has acted as an effective barrier in preventing contaminants from migrating vertically from the surface into the aquifer. The only exception to this conclusion is the contamination found in the aquifer at MW-19 which is located in a primary source area. The lead contamination found at MW-4/MW-21 may indicate otherwise, but the source of this contamination is uncertain. CDM believes the likely source of this



Ross Metals Site  
Rossville, Tennessee

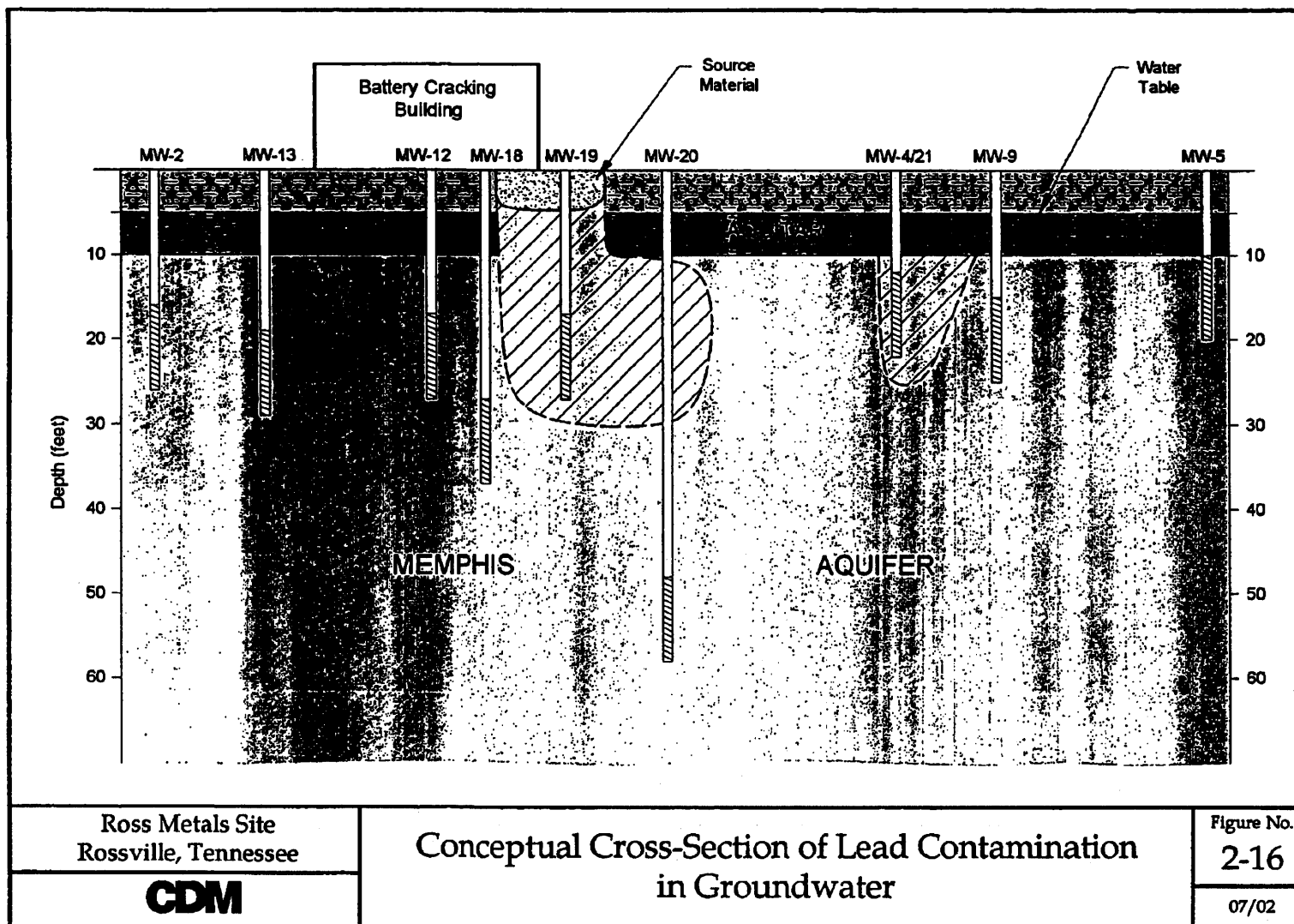
**CDM**

Estimated Horizontal Extent  
of Lead Contamination  
in Groundwater

Figure No.

2-15

07/02



contamination is the migration of surface water runoff down MW-4 after it was damaged. No lead contamination has been found in groundwater upgradient of MW-4/MW-21 and there are no known lead source areas immediately upgradient of MW-4. In addition, lead was not detected in 2 of 3 unfiltered samples collected from this monitoring well during prior investigations (see Section 2.5.6), even with the turbidity of the samples being much higher. It is our assessment that MW-4 was damaged subsequent to these studies, and that this damage created a direct conduit for contamination to enter the aquifer. While it is possible that lead contamination from an unknown source may have just recently started migrating through the clay aquitard into the aquifer somewhere near MW-4/MW-21, CDM believes that given the limited mobility of lead in soils at the Site, the analytical history of monitoring well MW-4, and the lack of a definitive source near MW-4/MW-21, it is more likely that the damage inflicted on this monitoring well sometime prior to initiation of the 2000-2001 RI provided a conduit for contaminated surface water to migrate directly into the aquifer.

### **2.5.9 Contaminant Fate and Transport**

An evaluation of the potential environmental fate and transport of Site-related contaminants is important in determining the potential for exposure to the contaminants. Because the data collected during the 2000-2001 RI indicate that lead is the only Site-related contaminant of concern in groundwater at the RM Site, this section focuses on the potential fate and transport of lead in groundwater at the Site.

#### **2.5.9.1 Contaminant Migration**

Many factors influence the rate of contaminant movement in an aquifer system. These include the physical/chemical properties of the contaminants (e.g., solubility, density, viscosity, etc.), and the physical/chemical properties of the environment (e.g., soil permeability, porosity, bulk density, pH, particle size distribution, etc.). Because all these factors can affect the rate of contaminant movement through aquifers, it is very difficult to predict such movement. However, based on the data collected during the RI and other investigations involving the transport of lead in aquifers, some gross approximations of this movement can be made.

In general, once a contaminant reaches groundwater, it will move as groundwater moves, through the process of advection. Advection is defined as the process by which solutes are transported by the bulk motion of flowing groundwater. As discussed in Section 2, groundwater in the Memphis aquifer at the RM Site generally moves toward the north-northwest (toward the Wolf River). Thus, any movement of lead contamination in the Memphis aquifer at the Site would be expected, for the most part, to be laterally in this direction. Some movement of lead contamination downward into the deeper part of the Memphis aquifer might also be expected, since the vertical hydraulic gradient is expected to be downward in this aquifer, except near surface water features such as the Wolf River which may act as groundwater discharge points. In addition, while advection is the primary transport mechanism for contaminants in groundwater, the process of dispersion will also cause the contaminants to spread both horizontally and vertically. Dispersion generally causes contaminants to migrate (spread) 10 to 20 percent farther than migration created by advection alone.

Counteractive to the advection and dispersion processes, however, is the process of sorption which will retard the movement of a contaminant. Sorption of a contaminant to soil particles is generally described by its soil-water partition coefficient ( $K_d$ ). The soil-water partition coefficient can be expressed as:

$$K_d = \frac{\text{mass of contaminant on the solid phase per mass of solid phase}}{\text{concentration of solute in solution}}$$

In general, soil-water partition coefficients greater than 10 ml/g indicate significant sorption potential and thus limited propensity to migrate in groundwater. Although no

Site-specific studies have been conducted to determine an appropriate current soil-water partition coefficient for lead at the RM Site, studies conducted at other Sites have indicated a range of 19 ml/g to 1,405 ml/g, with an average of 270 ml/g, for sandy soils under normal pH conditions (Thibault, et al. 1990). Thus, in general, under current conditions, any lead still remaining in groundwater is expected to readily sorb to soil particles at the RM Site, severely limiting its mobility in the Memphis aquifer, both horizontally and vertically.

The limited mobility of lead in soils is likely why very little subsurface soil and groundwater contamination has been found at this Site. In fact, the only area where significant migration of lead from the surface to subsurface soils and groundwater has been found at this Site is in the area of the battery cracking building. While it's true that groundwater contamination was also found in the area of MW-4/MW-21, as discussed in Section 2.5.8, this contamination is not believed to have migrated through subsurface soils but instead likely migrated down the monitoring well when it became damaged. The presence of lead contamination in the subsurface in the battery cracking operation area is probably due to the nature of past operations in this area. It should be noted, that the soil-water partition coefficient for lead is highly dependent on pH. Under low pH conditions, the soil-water partition coefficient for lead is significantly reduced thus rendering it much more mobile in soils. This may explain how the subsurface soil as well as the groundwater in the area of the battery cracking building became contaminated with lead. When the facility was in operation, significant amounts of sulfuric acid were likely discharged to the surface in this area which then temporarily decreased the pH enough to allow the lead to migrate vertically into the subsurface. When the facility operations ceased in 1992, however, over time, the buffering capacity of the soils and groundwater in this area likely then allowed the pH to return to the normal conditions presently observed at the Site.

#### **2.5.9.2 Contaminant Persistence**

Persistence is the measure of how long a chemical will exist in the environment before it degrades or transforms, either chemically or biologically, into some other chemical. Some of the factors which affect the persistence of a chemical include the state of the chemical, the availability of the chemical, exposure to sunlight, oxygen availability, the types and quantities of microorganisms present, availability of nutrients, temperature, pH, as well as the presence of other chemicals which may inhibit or enhance degradation. Usually, persistence is expressed in terms of a chemical half-life and can be on the order of days, weeks, or years.

Because of the many complex factors which may affect persistence, the actual rate of chemical degradation is very difficult to predict for a given chemical at a given site, especially without the benefit of any degradation data collected from site-specific field studies. However, based on the histories of lead contamination in the subsurface at other similar sites, lead has a very low potential to degrade in the subsurface at the RM Site. In fact, for all practicable purposes, the lead contamination found in the subsurface at this Site will likely persist indefinitely.

#### **2.5.9.3 Contaminant Fate and Transport Summary**

Significant migration of lead downward from the surface to subsurface soils and groundwater at the Site appears to have occurred only in the battery cracking building area. This contaminant migration likely occurred in the past when the pH in the subsurface was significantly reduced due to the discharge of sulfuric acid in this area. However, with the pH conditions having returned to more normal conditions at the Site, any further migration of lead both vertically and horizontally through subsurface soils and in groundwater is expected to be very limited due to the significant sorption potential of lead naturally attenuating the lead contamination. This includes the groundwater contamination found at MW-4/MW-21. Thus, while the lead contamination currently present in the subsurface at this Site will likely persist indefinitely, it will not likely move significantly due to natural attenuation. In addition, with the removal of all surface and

subsurface soils contaminated significantly with lead, as is planned for the Site, any further migration of lead into and through the Memphis aquifer becomes even more unlikely. In fact, with the concentrations of lead in groundwater being less than an order of magnitude higher than the SDWA action level of 15 ug/L, and with the planned removal of the contaminated soils, not only is it likely that any further migration of lead will be halted, it is also likely that natural attenuation of lead in groundwater (through sorption) will reduce the concentrations of lead below the SDWA action level of 15 ug/L in a reasonable time frame compared to other potential remedial alternatives. There are already indications that the lead contamination in groundwater in the area of MW-4/MW-21 is being naturally attenuated, as the concentrations of lead measured in samples collected from this area have been steadily decreasing from a high of 110 ug/L in December 1999 to the current (January 2002) concentration of 67 ug/L.

## **2.6 SUMMARY OF SITE RISKS**

The primary purpose of this baseline risk assessment (BRA) is to provide a quantitative and qualitative understanding of the actual and potential risks to human health posed by the RM Site if no further remediation or institutional controls are applied.

### **2.6.1 Data Evaluation**

Data used in this risk assessment were obtained from the RI conducted by CDM in the spring of 2001. The goals of the RI were:

1. confirm the nature and extent of groundwater contamination
2. aid in the development of remedial alternatives that may be necessary to address any threat identified by the investigation

To achieve these goals, a quality assurance (QA) plan was implemented, beginning in the planning stage and continuing through sample collection, analyses, reporting and final review. The RI report discusses the QA protocols that were followed to insure that samples were collected and analyzed in accordance with standard operating procedures. Through these efforts, it may be concluded that the data that were obtained are of sufficient quality to use in a baseline risk assessment.

Chemicals of potential concern (COPCs) are chemicals whose data are of sufficient quality for use in the quantitative risk assessment, are potentially site- related, and represent the most significant contaminants in terms of potential toxicity to humans. As noted above, the laboratory analyses were of sufficient quality for use in a BRA. The remaining steps in the COPC identification process are described below.

First, the data were summarized to show all analytes that were positively identified in at least one sample. Included in this group were unqualified results and results that were qualified with a *J* which means the chemical was present but the concentration was estimated. These values were listed as actual detected concentrations which may have the effect of under- or over-estimating the actual concentration.

Next, the laboratory data were tabulated to show the range of detections above the sample quantitation limit (SQL), the number of detections above the SQL, and the number of samples that were collected.

Finally, these positively identified analytes were screened to exclude analytes that, although present, are not important in terms of potential human health effects. The screening criteria fall into two categories:

1. Inorganics that are essential nutrients or are normal components of human diets were excluded. Calcium, magnesium, potassium, and sodium were excluded for this reason.

2. Inorganics whose maximum concentration was lower than a preliminary remedial goal concentration corresponding to an excess cancer risk level of  $1 \times 10^{-6}$  or a Hazard Quotient (HQ) level of 0.1, as determined by EPA Region 9 toxicologists using residential land use assumptions, were excluded (EPA 2000).

COPCs in groundwater are summarized in **Table 2-3**.

#### 2.6.2 Exposure Assessment

Exposure pathways are determined in a conceptual site model that incorporates information on the potential chemical sources, release mechanisms, affected media, potential exposure pathways, and known receptors to identify complete exposure pathways. A pathway is considered complete if (1) there is a source or chemical release from a source; (2) there is an exposure point where contact can occur; and (3) there is a route of exposure (oral, dermal, or inhalation) through which the chemical may be taken into the body.

The conceptual site model for this assessment is presented in **Figure 2-17**. As seen in this figure, the primary sources of groundwater contamination are believed to be contamination released during battery cracking operations and lead-contaminated surface water runoff flowing directly into the aquifer via a damaged monitoring well (since abandoned). Contamination is centered around MW-19 (near the battery cracking building) and MW-4/MW-21 (MW-4 was the damaged well that has since been abandoned). As discussed in Section 2.5.9, lead is relatively immobile in groundwater.

Based on this understanding of the fate and transport of contaminants, future residential ingestion of groundwater is the only potentially complete exposure pathway. Since the COPCs are not volatile, inhalation of volatiles released from groundwater while showering is not a potentially complete exposure route.

According to EPA Region 4 guidance, exposure point concentrations (EPCs) for groundwater are to be based on the results from wells in the center of the plume (EPA 1995). However, in this case there is no discernable plume. In such cases, Region 4 policy is to use the lower of the 95 percent upper confidence limit (UCL) on the mean or the maximum as the exposure point concentration. Where a COPC was not detected at a given location, one-half the SQL was used as a proxy concentration; however, if both the proxy concentration and the UCL exceeded the maximum detected value, the maximum detected value was used as the RME concentration. In no case was the proxy concentration used as the EPC. The RME concentrations for COPCs in groundwater are presented in **Table 2-4**.

Human intakes were calculated for each chemical and receptor using the RME concentrations. Estimates of human intake, expressed in terms of mass of chemical per unit body weight per time (mg/kg-day), were calculated differently depending on whether the COPC is a non-carcinogen or a carcinogen. For non-carcinogens, intake was averaged over the duration of exposure and is referred to as the average daily dose (ADD). For carcinogens, intake was averaged over the average lifespan of a person (70 years) and is referred to as the lifetime average daily dose (LADD). ADDs and LADDs were calculated using standard assumptions and professional judgment.

As a measure of conservatism and to avoid redundancy, an effort was made to identify the most sensitive receptor to calculate non-cancer hazards and excess cancer risk levels. In the case of non-carcinogens, a child resident is the most sensitive receptor, owing to its lower body mass relative to the amount of chemical intake. For carcinogens, a resident from child through adult (child/adult), is the most sensitive receptor because the excess cancer risk for the child (exposure duration of six years) is assumed to be additive to that of an adult (exposure duration of 24 years). For this reason, no calculations of excess cancer risk are included for child residents and no calculations of noncancer hazards are included for child/adult residents.

**Table 2-3**  
**Chemicals of Potential Concern in Groundwater**  
**Ross Metals OU-2**

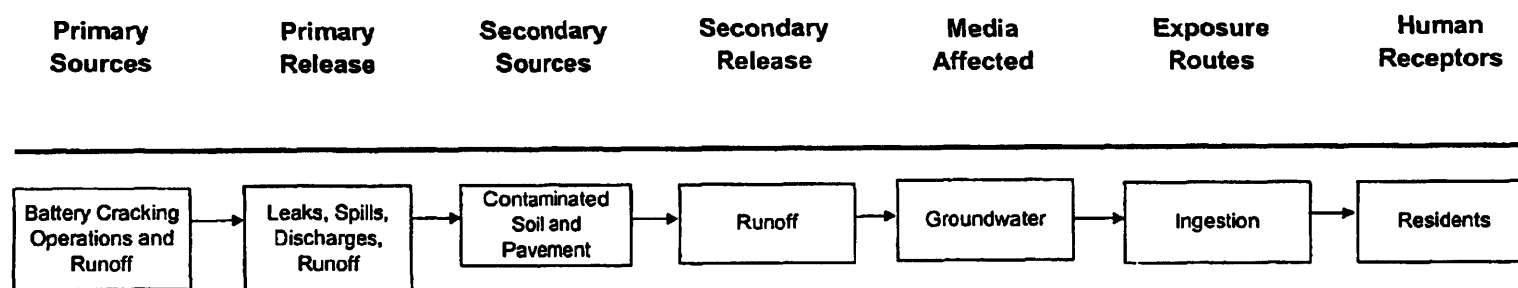
Chemical	Minimum Concentration/ Qualifier 1		Maximum Concentration/ Qualifier 1		Units	Location of Maximum Concentration
Arsenic	1.0	-	4.0	-	ug/l	MW-02
Iron	30	-	4,000	-	ug/l	MW-12
Lead	1.0	-	86	-	ug/l	MW-04
Manganese	18	-	520	-	ug/l	MW-02

Footnotes:

1. Minimum/maximum detected concentration in: MW 1-4, -4X, -5, -7 through -21. J is an estimated value.  
 -\* is a result that did not require qualification.

Figure 2-17  
Conceptual Site Model  
Ross Metals OU2

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**Table 2-4**  
**Exposure Point Concentrations Summary**  
**Reasonable Maximum Exposure**  
**Ross Metals OU-2**

Chemical of Potential Concern	Units	Arithmetic Mean 1	95% UCL of Log-Transformed Data	Maximum 2 Concentration/Qualifier 3	Exposure Point Concentration			
					Value	Units	Statistic 4,5	Rationale
Arsenic	ug/l	0.9	1.0	4.0 -	1.0	ug/l	95% UCL T	Reg 4 Guidance
Iron	ug/l	482	811	4,000 -	811	ug/l	95% UCL-T	Reg 4 Guidance
Lead	ug/l	7	14	86 -	86	ug/l	Maximum	Reg 4 Guidance
Manganese	ug/l	46	317	520 -	317	ug/l	95% UCL-T	Reg 4 Guidance

Footnotes:

1. Calculated using one-half the sample quantitation limit for non-detects.
2. Minimum/maximum detected concentration in: MW 1-4, -4X, -5, -7 through -21. J is an estimated value.
3. “-” is a result that did not require qualification.
4. 95% UCL of Log-transformed Data (95% UCL-T)
5. Maximum used as the exposure point concentration when the 95% UCL exceeds the maximum.

Note: The maximum value for lead in MW-4 used for the IEUBK model per Region 4 guidance.

### 2.6.3 Toxicity Values

EPA toxicity values that were used in included reference dose values (RfDs) for non-carcinogenic effects and cancer slope factors (CSFs) for carcinogenic effects. RfDs have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting carcinogenic (systemic) effects. CSFs are route-specific values derived only for compounds that have been shown to cause an increased incidence of tumors in either human or animal studies.

The RfDs and CSFs used in this assessment were primarily obtained from EPA's Integrated Risk Information System (IRIS) database (EPA 2002). Values that appear in IRIS have been extensively reviewed by EPA work groups and thus represent Agency consensus. If no values for a given compound and route of exposure were listed in IRIS, then EPA's Health Effects Assessment Summary Tables (HEAST) (EPA 1997c) were consulted. Where no value was listed in either IRIS or HEAST, EPA's National Center for Environmental Assessment (formerly the Environmental Criteria and Assessment Office) was consulted. **Tables 2-5** and **2-6** summarize the toxicity values for non-carcinogenic and carcinogenic COPCs, respectively.

Neither a CSF nor an RfD is available for lead. Instead, blood lead concentrations have been accepted as the best measure of exposure to unacceptable concentrations of lead. Because children are the most vulnerable to lead toxicity, EPA has developed an integrated exposure uptake biokinetic model (IEUBK) to assess chronic, non-carcinogenic exposures of children to lead. The IEUBK provides a predicted blood lead concentration based on assumed exposures to lead in all environmental media. The model has established default lead concentrations to be used for exposure media that do not have site-specific lead levels. When this model is used, and the detected concentrations are shown to be acceptable to the most vulnerable group in the population (children), it is not necessary to address adult exposure.

### 2.6.4 Risk Characterization

No groundwater is in use at the Site. Therefore, no excess cancer risk or non-cancer hazards are associated with the current use scenario. In the future, the Site may be redeveloped for residential use. Potential receptors would be child residents, and child/adult residents. Ingestion of groundwater is the only potentially complete exposure route.

#### *Child Residents*

**Table 2-7** summarizes the non-cancer risks for child residents. Non-cancer effects are possible based on an HI of 1. However, when the COPCs are examined by critical effect, none exceeds an HI of 1. This indicates that non-cancer hazards associated with drinking the groundwater are not expected.

#### *Child/Adult Residents*

**Table 2-8** summarizes the cancer risks for child/adult residents. The total incremental lifetime cancer risk estimate is  $2 \times 10^{-5}$ . This is within EPA's target range for Superfund sites. Ingestion of arsenic in groundwater accounts for the excess cancer risk.

Table 2-7

#### *Exposure to Lead*

Lead was detected in groundwater at concentrations ranging from 1 to 86 ug/L. Only MW-4/MW-21 (86 ug/L maximum) and MW-19 (21 ug/L) had concentrations in excess of EPA's and the state's action level for lead (15 ug/L). These concentrations of lead in groundwater were input into EPA's Integrated Exposure Uptake Biokinetic (IEUBK) model (IEUBKwin Version 1.0). Default lead concentrations were used for the remaining parameters (air [0.1 ug/m<sup>3</sup>], dietary intake [5.53 ug/day to 7 ug/day], soil and dust [200 and 150 ug/g for outdoor and indoor soil and dust lead, respectively], and mother's blood lead concentration at childbirth [2.5 ug/dl]). Children ranging in age from zero to seven years

**Table 2-5**  
**Non-Cancer Toxicity Data**  
**Ross Metals OU-2**

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Primary Target Organ(s)	Combined Uncertainty/ Modifying Factors	RfD: Target Organ(s)	
		Value	Units			Source(s)	Date(s)
Arsenic	Chronic	3E-004	mg/kg/day	Skin (Hyperpigmentation)	3	IRIS	04/10/98
Iron	Chronic	3E-001	mg/kg/day	No adverse effect	1	NCEA	1999
Lead	Chronic	NA	mg/kg/day	CNS (Neurotoxicity)	NA	NA	NA
Manganese 1	Chronic	2.4E-002	mg/kg/day	CNS (Neurotoxicity)	3	Region 4	1995

Notes:

1. The RfDo for manganese in IRIS is 1.4E-1 mg/kg/day based on the NOAEL of 10 mg/day. For soil exposure, Region 4 policy is to subtract the average daily dietary exposure (5 mg/day) from the NOAEL to determine a "soil" RfDo. When this is done, a "soil" RfDo of 7E-2 mg/kg/day results. For water, a neonate is considered a sensitive receptor for the neurological effects of manganese. Thus, caution (in the form of a modifying factor) is warranted until more data are available.

Using a modifying factor of 3, a "water" RfD of 2.4E-2 is obtained.

Acronyms:

RfD - Reference dose

IRIS - Integrated Risk Information System

HEAST - Health Effects Assessment Summary Tables

**Table 2-6**  
**Cancer Toxicity Data**  
**Ross Metals OU-2**

Chemical of Potential Concern	Oral Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description 1	Oral CSF: Absorption Efficiency	
	Value	Units		Source(s)	Date(s)
Arsenic	1.5E+000	(mg/kg/day) <sup>-1</sup>	A	IRIS	04/10/98
Iron	NA	(mg/kg/day) <sup>-1</sup>	D	NA	NA
Lead	NA	(mg/kg/day) <sup>-1</sup>	B2	IRIS	05/05/98
Manganese	NA	(mg/kg/day) <sup>-1</sup>	D	IRIS	05/05/98

Notes:

- EPA Group:
  - A - Human carcinogen
  - B1** - Probable human carcinogen - indicates that limited human data are available
  - B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
  - C - Possible human carcinogen
  - D - Not classifiable as a human carcinogen
  - E - Evidence of noncarcinogenicity

Acronyms:

CSF - Cancer Slope Factor

IRIS - Integrated Risk Information System

NA - Not applicable

**Table 2-7**  
**Summary of Receptor Hazards for COPCs**  
**Child Resident Scenario**  
**Reasonable Maximum Exposure**  
**Ross Metals OU-2**

Chemical of Potential Concern	Non-Carcinogenic Hazard Quotient				
	Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Arsenic	Skin (Hyperpigmentation, kerato	0.2	NA	NA	0.2
Iron	No adverse effect	0.2	NA	NA	0.2
Lead	CNS (Neurotoxicity)	NA	NA	NA	NA
Manganese	CNS (Neurotoxicity)	0.8	NA	NA	0.8
<b>Total</b>	<b>Total</b>	<b>1</b>	<b>NA</b>	<b>NA</b>	<b>1</b>
<b>Total Hazard Index Across All Media and All Exposure Routes</b>					<b>1</b>
<b>Total skin HI Across All Media</b>					<b>0.2</b>
<b>Total CNS HI Across All Media</b>					<b>0.8</b>

**Conclusion:**

1. The hazard Index is equal to one, indicating non-cancer effects are possible. However, when critical effects are considered, none exceeds one. This indicates that non-cancer hazards are not expected.

**Table 2-8**  
**Summary of Receptor Risks for COPCs**  
**Child / Adult Resident Scenario**  
**Reasonable Maximum Exposure**  
**Ross Metals OU-2**

Chemical of Potential Concern	Carcinogenic Risk			
	Ingestion	Dermal	Inhalation	Exposure Routes Total
Arsenic	2E-005	NA	NA	2E-005
Iron	NA	NA	NA	NA
Lead	NA	NA	NA	NA
Manganese	NA	NA	NA	NA
<b>Total</b>	<b>2E-005</b>	<b>NA</b>	<b>NA</b>	<b>2E-005</b>
<b>Total Risk Across All Media and All Exposure Routes</b>				<b>2E-005</b>

**Conclusion:**

1. The excess cancer risk level is within EPA's acceptable range ( $1 \times 10^{-4}$  and  $1 \times 10^{-6}$ ).

of age were evaluated.

EPA uses a level of 10 ug lead per deciliter (dl) blood as the benchmark to evaluate lead exposure. For MW-4/MW-21, the projected blood lead levels for 36 percent of the population are above the 10 ug/dl benchmark. EPA's soil lead directive describes the health protection of this receptor as "a typical (or hypothetical) child or group of similarly exposed children [should] have an estimated risk of no more than 5 percent exceeding the 10 ug/dl blood lead level" (EPA 1994). Since the IEUBK model predicts that 36 percent of the population will have blood lead above 10 ug/dl, the risk to both the population and to an individual due to exposure to lead in groundwater at this location are above the acceptable range. The model predicts that exposure to groundwater from MW-19 will result in only 5 percent of the population exceeding the 10 ug/dl benchmark. This indicates that the risks associated with consumption of groundwater at this location are acceptable.

Lead is the only contaminant of concern (COC) in groundwater. The risk assessment identified iron and manganese as well; however, these elements, are unrelated to Site activities and are believed to be naturally occurring. The response action selected in this Record of Decision is necessary to protect public health from an actual release of lead from this Site which may present an imminent and substantial endangerment to public health.

## **2.7 REMEDIATION OBJECTIVES**

### **2.7.1 Remedial Goals**

Lead is the only contaminant of concern (COC) in groundwater. **Table 2-9** shows the range of detected concentrations of lead and its remedial goal.

### **2.7.2 Remedial Action Objectives**

The remedial action objectives (RAOs) for the Ross Metals Site are as follows:

- prevent ingestion of lead-contaminated groundwater having concentrations in excess of SDWA MCL;
- restore the groundwater aquifer system by cleanup to the SDWA MCL for lead, and prevent the migration of lead beyond the existing limits of the known contaminant plume or established point of compliance;
- prevent discharge of lead to surface water bodies that would exceed surface water quality standards; and
- control future releases of lead in groundwater to ensure protection of human health and the environment.

## **2.8 DESCRIPTION OF ALTERNATIVES**

In order to establish priority among these criteria, they are separated into three groups. The first two criteria listed are threshold criteria, and must be satisfied by the remedial action alternative being considered. The next five criteria are secondary criteria used as balancing criteria among those alternatives which satisfy the threshold criteria. The last two criteria are not evaluated during the FS. State and community acceptance is evaluated by EPA during the public comment period of the proposed plan, and an EPA responsiveness summary is incorporated into the ROD. The objective of this section is to evaluate each of the alternatives for Site remediation individually on the basis of the threshold and balancing criteria. A summary of this analysis is presented in **Table 2-10**.

### **2.8.1 ALTERNATIVE 1 – NO ACTION**

#### **2.8.1.1 Description**

Under this alternative, no action would be taken to remedy the contaminated groundwater at

**Table 2-9**  
**Remedial Goal**  
**Ross Metals OU-2**

Chemical of Concern	Detections 1 (ug/l)		ARAR/TBC (ug/l)		
	Min	Max	HB	Not HB	Standard
Lead	1	86	15	-	TT 2

Notes:

1. Minimum/maximum detected concentration in: MW 1-4, -4X, -5, -7-21.
2. TT: Treatment Technique Action Level, 56 FR 26548, June 7, 1991.

Acronyms:

ARAR/TBC: Applicable or Relevant and Appropriate Requirement/To-Be-Considered  
HB: Health-based

the Site. The alternative would only involve the continued monitoring of groundwater at the Site. Existing groundwater wells would be sampled for the COCs found in groundwater every five years for 30 years. Five-year reviews would be conducted to assess the ongoing risks to human health and the environment posed by the Site. The evaluations would be based on the data collected from the groundwater monitoring.

#### **2.8.1.2 Overall Protection of Human Health and the Environment**

The no action alternative does not eliminate any exposure pathways or reduce the level of risk of the existing groundwater contamination.

#### **2.8.1.3 Compliance with ARARs**

Based on the nature and extent of the contaminant plume, this alternative may potentially achieve the RAOs and chemical-specific ARARs established for groundwater. Location- and action-specific ARARs do not apply to this alternative since further remedial actions will not be conducted.

#### **2.8.1.4 Long-Term Effectiveness and Permanence**

The continued potential exposure of contaminated groundwater to surface water and future on-Site receptors is a potential long-term impact of this alternative, although the nature of the contaminant plume might allow for eventual achievement of remediation goals derived for protection of human health and the environment. Because contaminated groundwater remains under this alternative, a review/reassessment of the conditions at the Site would be performed at 5-year intervals to ensure that the remedy does not become a greater risk to human health and the environment.

#### **2.8.1.5 Reduction of Mobility/Toxicity/Volume Through Treatment**

Contaminant mobility may be reduced.

#### **2.8.1.6 Short-Term Effectiveness**

Since no further remedial actions would be implemented at the Site, this alternative poses no short-term risks to on-Site workers. It is assumed that Level D personal protection would be used when sampling the groundwater.

#### **2.8.1.7 Implementability**

This alternative could be implemented immediately since monitoring equipment is readily available and procedures are in place.

#### **2.8.1.8 Cost**

The total present worth cost for this alternative is approximately \$ 52,000. There are no capital costs associated with this alternative.

### **2.8.2 Alternative 2 – Monitored Natural Attenuation with Deed Restrictions**

#### **2.8.2.1 Description**

Alternative 2 includes monitored natural attenuation (MNA) and the implementation of deed restrictions. Natural attenuation is not a technology, but at some sites, data gathered during the RI/FS may indicate that physical or biological processes (unassisted by human intervention) may effectively reduce contaminant concentrations such that remedial objectives in the contaminant plume or certain portions of the plume are achieved in a reasonable time frame without active remediation. To varying degrees of effectiveness, natural attenuation processes are typically occurring at all sites. Natural attenuation processes may reduce the potential risk posed by Site contaminants in three ways:

**Table 2-10**  
**Summary of Groundwater Alternatives Evaluation**  
**Ross Metals Site OU2**

Remedial Alternative	Threshold Criteria		Balancing Criteria					
	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of M/T/V Through Treatment	Short-Term Effectiveness	Implementability		Cost Approx. Total Present Worth
						Technical/Engineering Considerations	Estimated Time for Implementation (years)	
1 -- No Action	Does not eliminate exposure pathways or reduce the level of risk. Does not limit migration of or remove contaminants.	Chemical-specific ARARs are not met. Location- and action-specific ARARs do not apply	The contaminated groundwater is a long-term impact. The remediation goals and MCLs are not met.	No reduction of M/T/V is realized.	Level D protective equipment is required during sampling.	None	<1	\$43,000
2 -- Limited Action	Because of limited nature of plume, may effectively eliminate exposure pathways and reduce the level of risk.	Chemical-specific ARARs can be met. Location- and action-specific ARARs do not apply unless contingency component is implemented.	The contaminated groundwater is a long-term impact. The remediation goals and MCLs can be met.	No reduction of M/T/V is realized, unless contingency component is implemented.	Level D protective equipment is required during sampling.	Additional data collection needed to determine aquifer characteristics and vertical extent of contamination. Treatability study may be needed to develop contingency treatment component	5	\$350,000
3 -- In Situ Action	Eliminates exposure pathways and reduces the level of risk. Reduces contamination and eliminates further migration.	Chemical-specific ARARs are met. Location- and action-specific ARARs are applicable and would need to be met.	Long-term public health threats associated with groundwater are eliminated. No residual risks from the alternative.	Mobility, toxicity and volume are reduced.	Level C and D protective equipment required during site activities. Excavating and grading may result in potential release of dust. Noise nuisance from use of heavy equipment.	Treatability study may be needed to define treatment component.	30	\$2.2 million
4 -- Pump & Treat With Physical and/or Chemical Treatment	Eliminates exposure pathways and reduces the level of risk. Reduces contamination and eliminates further migration.	Chemical-specific ARARs are met. Location- and action-specific ARARs are applicable and would need to be met.	Long-term public health threats associated with groundwater are eliminated. No residual risks from the alternative.	Mobility, toxicity and volume are reduced.	Level C and D protective equipment required during site activities. Excavating and grading may result in potential release of dust. Noise nuisance from use of heavy equipment.	Additional data collection required to determine aquifer characteristics and vertical extent of contamination.  Treatability study may be needed to define treatment component	4	\$790,000

- Transformation of contaminants to a less toxic form through destructive processes such as biodegradation or abiotic transformation;
- Reduction of contaminant concentrations thereby reducing potential exposure levels; and
- Reduction of contaminant mobility and bioavailability through sorption onto the soil (EPA 1999).

In some cases, remediation alternatives that combine active remediation (e.g., in source areas) with MNA may be appropriate. Consideration of MNA as an appropriate remedy at a given site should consider the following:

- Whether the contaminants present can be effectively remediated by natural attenuation processes;
- Whether or not the contaminant plume is stable and the potential exists for the environmental conditions that influence plume stability to change over time;
- Whether human health, drinking water supplies, other groundwaters, surface waters, ecosystems, sediments, air, or other environmental resources should be adversely impacted as a consequence of selecting MNA ;
- Current and projected demand for the affected resource;
- Whether the contamination will exert a long- term detrimental impact on available water supplies or other environmental resources
- Whether the estimated time frame is reasonable compared to time frames for more active methods;
- The nature and distribution of sources of contamination and whether they have been or can be controlled;
- Whether any resulting transformation products present a greater risk than the parent contaminants;
- The impact of existing and proposed active remediation upon the MNA component of the remedy; and
- Whether reliable site-specific mechanisms for implementing institutional controls are available (EPA 1999).

Implementation of this alternative usually requires modeling and evaluation of contaminant degradation rates and pathways and predicting contaminant concentration at down gradient receptor points. The primary objective of site modeling is to demonstrate that natural processes of contaminant degradation will reduce contaminant concentrations below regulatory standards or risk-based levels before potential exposure pathways are completed. In addition, long term monitoring must be conducted throughout the process to confirm that contaminant degradation, mobility reduction or concentration reduction is proceeding at rates consistent with meeting cleanup objectives. Compared with other remediation technologies, natural attenuation has the following advantages:

- Less generation or transfer of remediation wastes;
- Less intrusive as few surface structures are required;
- May be applied to all or part of a given site, depending on site conditions and cleanup objectives;
- Natural attenuation may be used in conjunction with, or as a follow-up to, other (active) remedial measures; and
- Overall cost will likely be lower than active remediation.

As summarized in Section 2.5.8, the nature and extent of the contaminant plume at RM OU #2, taken together with Site characteristics, and the remedial activities planned for OU #1, i.e., the excavation, treatment and off- Site disposal of "source" material, suggest that a consideration of MNA for OU #2 is appropriate.

Alternative 2 would also involve implementation of institutional measures to control, limit, and monitor activities on-Site. The objectives of institutional controls are to prevent prolonged exposure to contaminants, control future development, and prevent the installation of wells within the contaminant plume boundary. These objectives would be accomplished by monitoring contaminated groundwater at the Site, and limiting use and

access by placing restrictions on all properties within the contaminant plume area. The effectiveness of institutional controls would depend on their continued implementation.

#### **2.8.2.2 Overall Protection of Human Health and the Environment**

Because of source removal, treatment, and disposal planned for OU #1 and the limited nature of the groundwater contaminant plume, Alternative 2 may be effective in eliminating exposure pathways and reducing the level of risk through restrictions designed to prevent access and exposure to groundwater by limiting the type of activities that can take place at the Site.

#### **2.8.2.3 Compliance with ARARs**

Because the contaminant plume is limited, this alternative may be effective in achieving the RAOs and chemical-specific ARARs established for groundwater. Location- and action-specific ARARs would not apply to this alternative since further remedial actions will not be conducted (unless the contingency treatment component is implemented.)

#### **2.8.2.4 Long-Term Effectiveness and Permanence**

The continued potential exposure of contaminated groundwater to surface water and future on-Site receptors is a potential long-term impact of this alternative, although, the nature and extent of the contaminant plume along with the remediation of OU #1 might allow for the eventual achievement of remediation goals derived for protection of human health and the environment. Because contaminated groundwater remains under this alternative, a review/ reassessment of the conditions at the Site would be performed at 5-year intervals to ensure that the remedy does not become a greater risk to human health and the environment.

#### **2.8.2.5 Reduction of Mobility/Toxicity/Volume Through Treatment**

Contaminant mobility may be reduced.

#### **2.8.2.6 Short-Term Effectiveness**

Since no further active remedial actions would be implemented at the Site, this alternative poses no short-term risks to on-Site workers. It is assumed that Level D personal protection would be used when sampling the groundwater.

#### **2.8.2.7 Implementability**

This alternative could be implemented immediately since monitoring equipment is readily available and procedures are in place.

#### **2.8.2.8 Cost**

The total present worth cost for this alternative is approximately \$184,000. Capital cost associated with this alternative is \$57,000 and O&M costs are \$127,000.

### **2.8.3 Alternative 3 – In Situ Treatment With Physical or Chemical Process**

#### **2.8.3.1 Description**

Alternative 3 consists of the construction of an in situ treatment system. An in situ treatment system can be developed by constructing a series of injection wells to create treatment zones or by constructing a series of treatment walls. Treatment walls involve the construction of permanent, semi-permanent, or replaceable units across the flow path of a contaminant plume. As contaminated groundwater flows through the treatment wall, the contaminants are removed by physical, chemical and/or biological processes. These processes include degradation, sorption, and precipitation. Creation of treatment zones,

in place of treatment walls, that are confined within strict boundaries, can be accomplished with injection wells. Well systems typically involve the injection of fluids or fluid/particulate mixtures for distribution into a treatment zone within the target area of the aquifer.

Because a natural gradient of groundwater flow would be used to carry contaminants through the treatment zone, in situ treatment does not require continuous input of energy. In addition, in situ treatment can degrade or immobilize contaminants in situ without the need to bring them to the surface. Furthermore, technical and regulatory considerations related to effluent discharge requirements are avoided.

Under this alternative, either a series of wells creating a treatment zone, or a treatment wall would be constructed to intercept contaminated groundwater. For this alternative, construction of a continuous permeable reactive barrier downgradient of MW21 is assumed. For site contaminants, reactive media might include phosphates, ferrous hydroxide, ferrous carbonate, ferrous sulfide, magnetite, diethionite, zeolite, peat, humate, lignite, coal, or activated carbon.

The alternative includes the review of site data and if necessary, collection of additional data to develop the design of the in situ treatment for the RM OU #2 Site. A consideration of site hydrogeology, contaminant loading, geochemistry, and microbiology is necessary for development of an in situ treatment system to ensure that the contaminant plume does not pass over, under, or around the treatment zone and to ensure that the treatment zone can effectively treat contamination without rapidly plugging with precipitates or becoming passivated (EPA 1998). The in situ treatment system design, location, emplacement methodology and estimated life expectancy all rely on a consideration of site data.

A final component of Alternative 3 is the initiation of a compliance monitoring program to determine whether the treatment wall or zone is meeting design goals for groundwater remediation, and whether contaminant breakthrough or bypass, or formation of undesirable products is a concern.

#### **2.8.3.2 Overall Protection of Human Health and the Environment**

Treatment of contaminated groundwater virtually eliminates all risks associated with the exposure pathways. Treatment of contaminated groundwater in an on-Site treatment wall or other in situ treatment design (treatment wells) would block contaminated groundwater from moving off-Site and thus discharging into the surface water downgradient of the Site. Design-phase studies would ensure that the selected treatment system could remediate groundwater contaminant concentrations to meet remediation goals.

#### **2.8.3.3 Compliance with ARARs**

Implementation of this alternative would meet chemical-specific ARARs by reducing contaminant concentrations to levels below MCLs and groundwater remediation goals.

If the portion of the Site where this alternative would be implemented is considered a wetlands area, the requirements of the Protection of Wetlands Order (40 CFR 6) would need to be met. Otherwise, no conflicts with location-specific ARARs are expected for the implementation of this alternative.

All action-specific ARARs are expected to be met. ARARs for the control of fugitive dust emissions would be met by applying water to roads receiving heavy vehicular traffic and to trenching areas, as necessary.

#### **2.8.3.4 Long-Term Effectiveness and Permanence**

The in situ treatment system will have to be maintained to ensure that it continues to perform as designed; consequently, monitoring, inspection, and maintenance would be

required. The system may be susceptible to fouling or clogging, and, if applicable, it may also require periodic disposal of spent treatment media. However, the system would be inspected on a regular schedule, and required maintenance could be implemented. Monitoring would be required until all groundwater monitoring points indicate that contaminant concentrations are below action levels or MCLs. The use of a treatment wall or a well-based in-situ treatment system, in conjunction with source control activities, is a long-term solution because it would permanently reduce contaminant concentrations in groundwater.

#### **2.8.3.5 Reduction of Mobility/Toxicity/Volume Through Treatment**

The primary objective of this alternative is to reduce contaminant volume by removing contaminants from groundwater before or as it leaves the Site. Depending on the outcome of treatability testing and treatment media used, the treatment media may remove contaminants.

#### **2.8.3.6 Short-Term Effectiveness**

The construction phase of this alternative would most likely be accomplished within 2 to 3 months. However, implementation of the preferred removal action alternative for contaminated solid media would be required before installing an in situ treatment system for groundwater. A design-phase study may be needed before installing the treatment wall or well system.

On-Site workers would be adequately protected from short-term risks by using appropriate personal protective equipment and by following proper operating and safety procedures. However, short-term air quality impacts to the surrounding environment may occur during drilling and trenching. Dust emissions would be monitored at the property boundaries. Control of fugitive dust emissions would be provided by applying water as needed to surfaces receiving heavy vehicular traffic or in trenching areas.

#### **2.8.3.7 Implementability**

A design-phase study would be required to design an appropriate treatment system. Construction of a treatment wall system or well-based treatment system uses standard construction practices and equipment. No significant construction issues are expected to be encountered.

Under proper conditions, in situ treatment can immobilize inorganic contaminants. Treatability studies would be required to assure achievement of RGOs. The studies would be used to refine the processes and design parameters. Note that both bench-scale and pilot-scale studies may be required before full-scale implementation.

Wastewater may be generated during implementation of this alternative through water runoff generated as a result of dust emission control. Wastewater may also be generated as a result of decontamination activities required for equipment and on-Site workers. Containment and treatment or disposal of these wastewaters may be required.

No state or federal permits are expected to be required; however, advance consultation should occur in planning the action to ensure that all involved agencies are allowed to provide input.

All services and materials for this alternative are readily available.

#### **2.8.3.8 Cost**

As indicated above, a treatability study would be required to design and provide estimated costs for a Site-specific treatment system. For comparison purposes, estimated costs for this alternative are based on the installation of a funnel and gate design using phosphate and zero-valent iron. On this basis, the total present worth for Alternative 3 is

approximately \$2 million. The estimated capital cost is approximately \$700,000 and the estimated O&M cost is approximately \$1.3 million.

#### **2.8.4 Alternative 4 – Pump and Treat With Physical and/or Chemical Treatment**

##### **2.8.4.1 Description**

Alternative 4 consists of pumping groundwater from on-Site extraction wells or well points to an on-Site wastewater treatment system, and subsequent discharge to either a POTW or surface water. Pumping may be continuous or pulsed to allow equilibration of contaminants with the groundwater. Inorganic contaminants could be removed from groundwater with a precipitation/coagulation/flocculation process. Typical removal of metals employs precipitation with hydroxides, carbonates or sulfates. Lime, soda ash, or sodium sulfide is added to water in a rapid-mixing tank along with flocculating agents such as alum, lime, and various iron salts. A flocculation chamber then agglomerates particles, which are then separated from the liquid phase in a sedimentation chamber.

Other processes that could be used for the treatment of inorganics in the waste stream include ion exchange, neutralization, and chemical reduction. Neutralization is an effective process for treating certain metals by altering pH thus causing metals to drop out. Chemical reduction is primarily used for treatment of wastes containing hexavalent chromium, mercury, and lead. Common reducing agents include sulfur dioxide and sulfide salts, and ferrous sulfate. Filtration is an effective technology when removal of low level suspended solids is required.

##### **2.8.4.2 Overall Protection of Human Health and the Environment**

Treatment of contaminated groundwater virtually eliminates all risks associated with the exposure pathways. Extraction of contaminated groundwater would block contaminated groundwater from moving into the wetlands and thus discharging into the surface water downgradient of the Site. Design-phase studies would help ensure the development of a treatment system that could remediate groundwater contaminant concentrations to meet remediation goals.

##### **2.8.4.3 Compliance with ARARs**

Implementation of this alternative would meet chemical-specific ARARs by reducing contaminant concentrations to levels below MCLs and lead concentrations below the action level.

If the portion of the Site where this alternative would be implemented is considered a wetlands area, the requirements of the Protection of Wetlands Order (40 CFR 6) would need to be met. Otherwise, no conflicts with location-specific ARARs are expected for the implementation of this alternative.

All action-specific ARARs are expected to be met. Dust suppression and control requirements (Rule 1200-3-8) apply to activities, such as trenching, associated with this alternative. ARARs for the control of fugitive dust emissions would be met by applying water to roads receiving heavy vehicular traffic and to trenching areas, if as necessary.

##### **2.8.4.4 Long-Term Effectiveness and Permanence**

The pump-and-treat system will have to be maintained to ensure that it continues to perform as designed; consequently, monitoring, inspection, and maintenance would be required. The system may be susceptible to fouling, clogging, or other mechanical failure, and it may also require periodic disposal of sludge generated during treatment. However, the system would be inspected on a regular schedule, and required maintenance could be implemented. Monitoring would be required until all groundwater monitoring points indicate that contaminant concentrations are below action levels or MCLs.

Pump-and-treat, in conjunction with source control activities, is a long term solution because it would permanently reduce contaminant concentrations in groundwater. Using precipitation/flocculation/coagulation and sedimentation as a basis, the length of time required to achieve remediation is estimated as four years for costing purposes.

#### **2.8.4.5 Reduction of Mobility/Toxicity/Volume Through Treatment**

The primary objective of this alternative is to reduce contaminant volume by removing contaminated groundwater from the Site. Removal would also eliminate migration of contaminated groundwater from the Site.

#### **2.8.4.6 Short-Term Effectiveness**

The construction phase of this alternative would most likely be accomplished within 2 to 8 weeks. However, implementation of the remedial alternative for contaminated solid media would be required before installing the pump-and-treat system. Design-phase studies would be used to develop the Site-specific pump-and-treat system to be used.

On-Site workers would be adequately protected from short-term risks by using appropriate personal protective equipment and by following proper operating and safety procedures. However, short-term air quality impacts to the surrounding environment may occur during drilling and trenching. Dust emissions would be monitored at the property boundaries. Control of fugitive dust emissions would be provided by applying water as needed to surfaces receiving heavy vehicular traffic or in trenching areas.

#### **2.8.4.7 Implementability**

A design-phase study would be required to design an appropriate treatment system. Construction of the pump-and-treat system uses standard construction practices and equipment. No significant construction issues are expected to be encountered.

Wastewater may be generated during implementation of this alternative through water runoff generated as a result of dust emission control. Wastewater may also be generated as a result of decontamination activities required for equipment and on-Site workers. Containment and treatment or disposal of these wastewaters may be required.

No state or federal permits are expected to be required; however, advance consultation should occur in planning the action to ensure that all involved agencies are allowed to provide input. All services and materials for this alternative are readily available.

#### **2.8.4.8 Cost**

Using precipitation/flocculation/coagulation treatment as a basis, the total present worth for Alternative 4 is approximately \$790,000. The estimated capital cost is approximately \$350,000 and the estimated O&M cost is approximately \$443,000.

### **2.9 COMPARATIVE ANALYSIS OF ALTERNATIVES**

This section presents a comparative analysis of the groundwater alternatives based on the threshold and balancing evaluation criteria. The objective of this section is to compare and contrast the alternatives so that decision makers may select a preferred alternative for presentation in the ROD.

The alternatives are presented here to give decision makers a range of potential actions that could be taken to remediate this Site. For groundwater, these actions include

- no action
- monitored natural attenuation with deed restrictions
- in situ treatment via physical/ chemical treatment
- pump and treat with physical or chemical treatment

## **Overall Protection of Human Health and the Environment**

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

All the alternatives, except the no-action alternative, are protective of human health and the environment by eliminating, reducing, or controlling risks posed by the Site. The protection from exposure to contaminated groundwater afforded by Alternatives 2, 3, and 4 would be dependent upon deed restrictions until natural attenuation (Alternative 2) or treatment (Alternatives 3 and 4) achieve the remedial objectives.

## **Compliance with Applicable or Relevant and Appropriate Requirements**

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides a basis for invoking a waiver.

All alternatives, except the no action alternative, will attain their respective Federal and State ARARs. However, drinking water standards will not be met through Alternative 2, natural attenuation with deed restrictions, as soon as the treatment alternatives (Alternatives 3 and 4.)

## **Long-Term Effectiveness and Permanence**

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain on Site following remediation and the adequacy and reliability of controls.

Each alternative, except the no-action alternative, provides some degree of long-term protection. The effectiveness and permanence of Alternatives 3 and 4 is dependent entirely upon the adequacy of maintenance. Alternative 2 does not remove contamination from groundwater, whereas Alternatives 3 and 4 do remove contamination through treatment.

Reviews at least every five years, as required, would be necessary to evaluate the effectiveness of any of these alternatives.

## **Reduction of Toxicity, Mobility, or Volume Through Treatment**

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Alternatives 1 and 2 do not include treatment as a component of the remedy. Therefore, these alternatives would not reduce the toxicity, or volume of contamination in groundwater. However, contaminant mobility will be reduced through natural attenuation. Alternatives 3 and 4 would provide the greatest reduction in the toxicity, mobility and volume of groundwater contamination at the Site.

## **Short-Term Effectiveness**

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

Under Alternatives 1 and 2, no further construction would be implemented at the Site and groundwater is not currently being used; therefore, these alternatives pose no short-term risks. Under Alternatives 3 and 4, the construction phase would most likely be

accomplished within two to three months. On-Site workers would be adequately protected from short-term risks by using appropriate personal protective equipment and by following proper operating and safety procedures. Short-term air quality impacts would be monitored and addressed by engineering controls as necessary.

### **Implementability**

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Under Alternatives 3 and 4, a design-phase study would be required to design appropriate treatment systems. The treatment alternatives are easily implemented. All materials and services needed for implementation are readily and commercially available. No significant construction issues are expected to be encountered.

### **Cost**

The estimated present worth costs for the alternatives, range from \$52,000 to \$2 million.

### **State Acceptance**

The State has expressed its support for Alternative 2. The State does not believe that Alternative 1 provides adequate protection of human health. The State prefers Alternative 2 to Alternatives 3 and 4 because Alternative 2 provides a better value for the money to be spent.

### **Community Acceptance**

During the public comment period, the community expressed its support for Alternative 2.

**Table 2-11** presents a summary of each remedial alternative along with ranking scores for each evaluation criterion. Each alternative's performance against the criteria (except for present worth) was ranked on a scale of 0 to 5, with 0 indicating that none of the criterion's requirements were met and 5 indicating all of the requirements were met. The ranking scores are not intended to be quantitative or additive, but rather are only summary indicators of each alternative's performance against the CERCLA evaluation criteria. The ranking scores combined with the present worth costs provide the basis for comparison among alternatives.

For groundwater, Alternatives 2, 3, and 4 rank higher than Alternative 1 in overall protection of human health and the environment, compliance with ARARs, long-term effectiveness and permanence, and reduction of M/T/V. Alternative 4 ranks higher in short-term effectiveness and implementability than Alternative 3. Note that the selection of a specific treatment technology for Alternatives 3 and 4 would be based on the outcome of design-phase studies and site-specific modeling to better define aquifer and plume properties, and ensure technical practicability.

## **2.10 SELECTED REMEDY**

The EPA Selected Remedy is Alternative 2. Based upon current information, this alternative appears to provide the best balance among the nine criteria that EPA uses to evaluate alternatives. EPA has determined that the preferred alternative would be protective of human health and the environment; would attain the Site goals; comply with ARARs; and would be cost effective.

The Selected Remedy consists of the following:

**Table 2-11**  
**Comparative Analysis of Groundwater Alternatives**  
**Ross Metals Site OU2**  
**Rossville, Tennessee**

Remedial Alternative	Criteria Rating <sup>1</sup>						Approximate Present Worth (\$)
	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of M/T/V Through Treatment	Short-Term Effectiveness	Implementability	
1 — No Action	0	0	0	0	5	5	\$43,000
2 — Limited Action	4	4	4	1	5	5	\$350,000
3 — In Situ Treatment w/ Physical/Chemical Treatment	5	5	4	5	3	3	\$2.2 million
4 — Pump and Treat with Physical/Chemical Treatment	5	5	5	5	4	4	\$790,000

<sup>1</sup> A ranking of "0" indicates noncompliance, while a ranking of "5" indicates complete compliance.

- Implementation of institutional measures to control future development and prevent installation of wells within the contaminant plume boundary by placing access and use restrictions on all properties within the contaminant plume boundary;
- Review/collection of hydrological, geochemical and microbial data as needed to establish use of monitored natural attenuation; and
- Development of monitoring program, including monitoring frequency and identification of a monitoring well network to confirm that contaminant mobility reduction or concentration reduction is proceeding at rates consistent with meeting cleanup objectives.

The total estimated construction costs associated with this alternative is \$57,000. The estimated Operations and Maintenance costs are \$127,000. The estimated total present worth cost is \$184,000.

### **Performance Standards**

Lead is the only COC in groundwater. The risk assessment identified iron and manganese as well; however, these elements, unrelated to Site activities, are believed to be naturally occurring, and therefore do not merit inclusion in the Site's performance standards. (See Section 2.5.8 for more details on this conclusion). Table 2-9 shows the range of detected concentrations of lead and its performance standard which is based on the treatment technique action level for lead established pursuant to the Safe Drinking Water Act.

### **Summary of Estimated Remedy Costs**

**Table 2-12** provides a capital cost estimate for implementing the selected remedy. **Table 2-13** is the estimate for operations and maintenance.

### **Expected Outcomes of the Selected Remedy**

The purpose of this response action is to eliminate risks posed by ingestion of contaminated groundwater. This will be accomplished by applying deed restrictions that prohibit the installation of drinking water wells on the Site. Further, contaminant concentrations in groundwater are expected to decline to acceptable levels owing to the process of natural attenuation. The natural attenuation process will be aided by the completion of the removal of contaminated source materials as specified in the OU #1 Record of Decision. Once these activities are complete, the Site will be available for industrial/residential/recreational land use.

## **2.11 STATUTORY DETERMINATIONS**

Under CERCLA Section 121, EPA must select remedies that are protective of human health and the environment, comply with applicable or relevant and appropriate requirements ( unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element. The following sections discuss how the selected remedy meets these statutory requirements.

### **2.11.1 Overall Protection of Human Health and the Environment**

EPA has concluded that the major risk to human health at the Site would be ingestion of contaminated groundwater containing lead. However, since no one presently obtains drinking water from the contaminated aquifer, no one is at risk at this time. In the future, if a drinking water well were installed within the contaminant plume, the levels of lead in the water would represent a health threat to child residents. Effects of great concern from low-level lead exposure are neurobehavioral effects and growth retardation in infants

<b>Table 2-12</b> <b>Capital Costs for Selected Remedy</b>				
Alternative 2 (Groundwater) -- Monitored Natural Attenuation with Deed Restrictions  Site Name: Ross Metals OU2 Site Location: Rossville, Tennessee			PRESENT WORTH COST  Discount Rate: 7%	
ITEM DESCRIPTION	UNITS	QUANTITY	UNIT PRICE DOLLARS	TOTAL COST DOLLARS
ADDITIONAL DATA REVIEW/COLLECTION Hydrological, geochemical, microbial data review/ collection	lump sum	1	\$50,000	\$50,000
Subtotal - Capital Cost				\$50,000
Engineering & Administrative (3% of Capital Cost)				\$1,500
Subtotal				\$51,500
Contingency (10% of Subtotal)				\$5,150
TOTAL CONSTRUCTION COST				\$56,650
PRESENT WORTH O&M COST				\$126,933
TOTAL PRESENT WORTH COST				\$183,583

**Table 2-13**  
**Operations and Maintenance Costs for Selected Remedy**

Alternative 2 (Groundwater)– Monitored Natural Attenuation				OPERATION & MAINTENANCE COSTS		
Site Name: Ross Metals OU2 Site Location: Rossville, Tennessee				Discount Rate: 7%		
ITEM DESCRIPTION	UNITS	QUANTITY	UNIT PRICE DOLLARS	TOTAL ANNUAL COSTS, DOLLARS	OPERATION TIME, YEARS	PRESENT WORTH
ANNUAL GROUNDWATER MONITORING						
Personnel (2-man crew @ 2 12-hour days)	hours	48	\$50	\$2,400	5	\$9,840
Supplies/Travel	days	3	\$3,000	\$9,000	5	\$36,902
Groundwater Sampling and Lab Testing	sample	5	\$700	\$3,500	5	\$14,351
Report Preparation	lump sum	1	\$2,500	\$2,500	5	\$10,250
5-YEAR REVIEWS						
Personnel (2-man crew @ 2 12-hour days)	hours	48	\$50	\$480	25	\$5,594
Supplies/Travel	days	3	\$3,000	\$1,800	25	\$20,976
Groundwater Sampling and Lab Testing	sample	5	\$500	\$500	25	\$5,827
Report Preparation	lump sum	1	\$5,000	\$1,000	25	\$11,654
O&M SUBTOTAL			\$21,180			\$115,394
Contractor Fee (10% of O&M cost)			\$2,118			\$11,539
Legal Fees, Licenses & Permits (5% of O&M Cost)			\$106			\$577
CONTINGENCY (10% of Subtotal)			\$2,118			\$11,539
SUBTOTAL			\$23,298			\$126,933

exposed while in the womb and children exposed after birth Note that the excess cancer risk is within EPA's acceptable risk range of  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ , and non-cancer hazards (other than those associated with lead) are not expected.

EPA's Selected Remedy protects human health by preventing, through deed restrictions, construction of drinking water wells on the Site. The environment is protected because lead concentrations in groundwater are expected to diminish to acceptable levels by the process of natural attenuation. Thus, the Wolf River, the groundwater discharge point, will not be impacted.

#### **2.11.2 Compliance with Applicable or Relevant and Appropriate Requirements ( ARARs )**

The selected remedy shall be in compliance with all Federal ARARs and any more stringent State ARARs.

The following ARARs will be attained by the selected remedy:

Contaminant-Specific:

- RCRA requirements for identification and listing of hazardous waste (40 CFR Parts 262 through 265 and Parts 124, 270, and 271).
- Clean Water Act requirements contained in 40 CFR Part 131
- Safe Drinking Water Act requirements contained in 40 CFR Parts 141 and 142

Note: Action-specific and location-specific ARARs do not apply to the planned remedial action.

#### **2.11.3 Cost-Effectiveness**

EPA's Selected Remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." (40 CFR 300.430(f)(1)(ii)(D). This was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (Long-term Effectiveness and Permanence; Reduction in Toxicity, Mobility, and Volume through Treatment; and Short-term Effectiveness). Overall effectiveness was then compared to costs to determine cost effectiveness. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs and hence represent a reasonable value for the money to be spent.

For this Site, Alternative 1 is not cost-effective because it does not pass the threshold criterion of Overall Protection of Human Health and the Environment. Alternatives 2, 3 and 4 were considered to be equally effective in terms of the threshold criteria, Overall Protection of Human Health and the Environment and Compliance with ARARs; however, compared to Alternative 2, Alternatives 3 and 4 were much more expensive: \$2 million and \$790,000 for Alternatives 3 and 4, respectively, compared to \$184,000 for Alternative 2. Alternative 2 was also superior in terms of Short-Term Effectiveness and Implementability. The only category in which Alternatives 3 and 4 were rated higher than Alternative 2 was in Reduction of Toxicity, Mobility, and Volume through Treatment. In consideration of all of these factors, Alternative 2 is determined to be the most cost-effective alternative.

#### **2.11.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable**

EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for this Site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the Selected Remedy provides

the best balance of tradeoffs in terms of the five balancing criteria, while also considering State and community preference.

The Selected Remedy addresses the principal threat posed by the Site by barring, through deed restrictions, future development of groundwater at the Site for drinking water purposes. The Selected Remedy satisfies the criterion for long-term effectiveness by recognizing the inherent power of natural attenuation to reduce lead concentrations in groundwater to acceptable levels. 2.11.5 Preference for Treatment as a Principal Element

The Selected Remedy does not utilize treatment in the traditional sense; the two alternatives that do involve treatment were judged no better at satisfying the Threshold Criteria and were much more expensive. However, natural processes that will reduce the lead concentrations in groundwater to acceptable levels (e.g., sorption and dispersion) offer permanent solutions nonetheless. Thus, the principle of this statutory preference is satisfied.

#### **2.11.6 Five-Year Requirements**

The cost estimate for the Selected Remedy includes funds for annual groundwater monitoring for five years, as well as groundwater monitoring for five-year reviews.

### 3.0 RESPONSIVENESS SUMMARY

The U.S. Environmental Protection Agency (EPA) held a public comment period from July 8, 2002 to August 7, 2002. The public comment period was held for interested parties to comment on the Remedial Investigation/Feasibility Study (RI/FS) results and the Proposed Plan for the Ross Metals Superfund Site in Rossville, Tennessee.

The Proposed Plan included in Appendix A of this document, provides a summary of the Site's background information leading up to the public comment period.

EPA held a public meeting at 6: 30 pm on July 18, 2002 at the Rossville Christian Academy, Rossville, Tennessee to outline the RI/FS and describe EPA's proposed remedial alternative for the Ross Metals Site. All comments received during the public comment period have been considered in the final selection of the remedial alternative.

#### 3.1 RESPONSIVENESS SUMMARY OVERVIEW

During the public comment period, the Rossville community and local government officials expressed their support of the EPA Selected Remedy. Four letters by the community were received during the public comment period which supported the Selected Remedy. As evidenced in the public meeting transcript, the community and local government officials expressed their support of the Selected Remedy during the meeting.

#### 3.2 SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED

The public comments appear in bold text and the EPA response follows.

- **Lead should be completely removed from the Site.**

Lead will be removed from the Site as part of Operable Unit 1.

- **Monitoring Wells will decrease resident's property value.**

Comment acknowledged. The current and any future monitoring well network is located on the Ross Metals property.

- **The community should be compensated for their loss.**

Compensation for decreased property value as a result of a Superfund Site is beyond the scope of the U. S. Environmental Protection Agency's regulatory ability.

- **City of Rossville's drinking water smells like fuel.**

Drinking water issues are handled by the State of Tennessee. These concerns were forwarded to the Tennessee Department of Environment and Conservation.

- **City of Rossville should make the cleanup decision at the Ross Metals Site.**

City of Rossville officials have expressed their support of the EPA Selected Remedy for the Ross Metals Site.

*A*



United States  
Environmental Protection  
Agency

Region 4  
61 Forsyth Street  
Atlanta, GA 30303

Alabama, Florida, Georgia,  
Kentucky, Mississippi,  
North Carolina, South  
Carolina, Tennessee

## SUPERFUND FACT SHEET

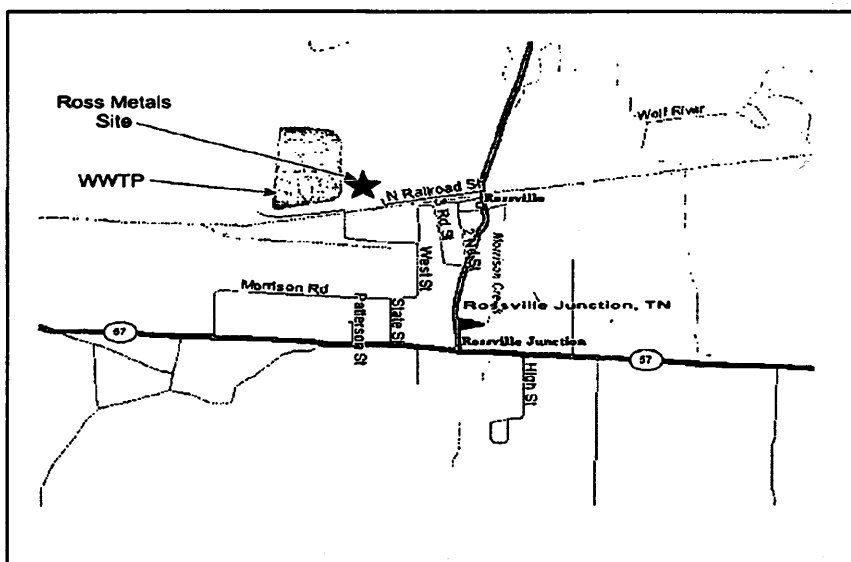
# PROPOSED PLAN FOR REMEDIAL ACTION OF GROUNDWATER AT THE ROSS METALS SUPERFUND SITE

Rossville, Tennessee

July 2002

### This fact sheet will provide:

- An overall Site review
- Results of the groundwater remedial investigation
- Possible health risks posed by groundwater at the Site
- A summary of treatment technologies
- A summary of the groundwater feasibility study
- A presentation of EPA's preferred alternative
- Announcement of the public comment period
- Places to get information



## INTRODUCTION

This Proposed Plan Fact Sheet is issued to describe the alternatives that the U.S. Environmental Protection Agency (EPA) has considered for the cleanup of groundwater at the Ross Metals *National Priorities List* (NPL) Site located in Rossville, Tennessee. This plan presents an evaluation of the cleanup alternatives, including the alternative preferred by EPA. The cleanup alternatives for groundwater are summarized in this Fact Sheet and are described in greater detail in the groundwater *Remedial Investigation* (RI) and *Feasibility Study* (FS) reports released earlier this year. The groundwater RI and FS reports are more complete sources of information and are part of the *Administrative*

*Record*. The Administrative Record consists of technical reports and reference documents used by EPA to develop the *Proposed Plan*. These documents may be found in the information repository located at the Rossville City Hall in Rossville, Tennessee.

Note that based on Site information, EPA has divided the Site into *Operable Units* (OUs) or cleanup phases, with the source (contaminated soil/slag/sediment) being the first

Note: Words that appear in the glossary on page 7, are in *italics* the first time they appear in the body of this fact sheet.



## PUBLIC MEETING

DATE: July 18, 2002

TIME: 6:30 p.m.

LOCATION:

Rossville Christian Academy  
280 High Street  
Rossville, Tennessee

Operable Unit and the groundwater being the second. This has been done to allow cleanup of the contaminated source material (soil/slag/sediment), while continuing to evaluate potential groundwater contamination. **This Proposed Plan Fact Sheet was prepared for Operable Unit 2 (OU 2) and addresses the potential cleanup of groundwater contamination only.** A Record of Decision (ROD) for Operable Unit 1 (OU 1), documenting the remedy already selected for the contaminated soils, landfill waste, wetlands, and buildings, was issued in 1999.

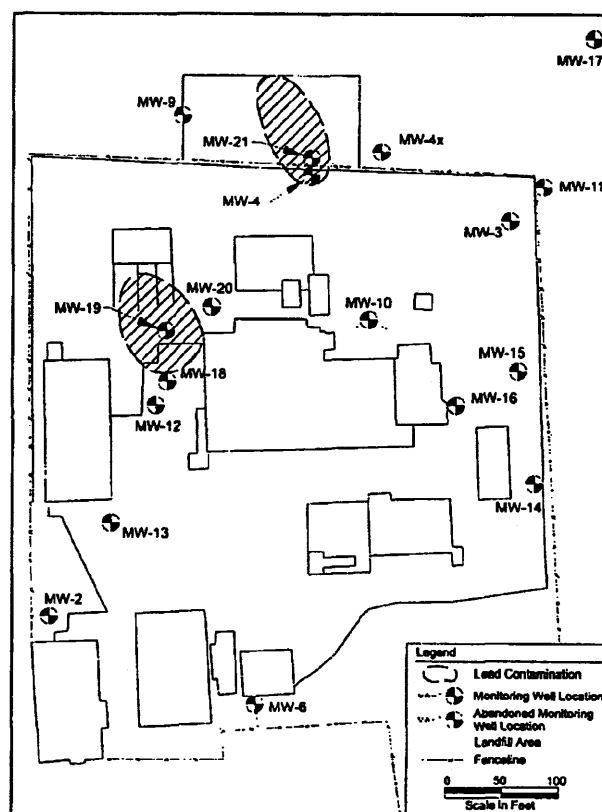
The preferred alternative EPA presents for OU 2 in this Fact Sheet represents a preliminary decision, subject to public comment. Section 117(a) of the *Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)* of 1980, as amended by the *Superfund Amendments and Reauthorization Act (SARA)* of 1986, requires public comment period, public notice, public meeting, and a brief analysis of the EPA preferred alternative for site remediation. EPA encourages the public to submit written comments on all alternatives presented in this plan. Please see page 8 for more information on where to submit written comments. EPA will consider public comments as part of the final decision-making process for selecting the cleanup remedy for OU 2 at the Site.

## SITE BACKGROUND

The Ross Metals Site (herein after referred to as “the Site”) operated as a secondary lead smelter from 1978 to 1992, during which the facility processed spent lead-acid batteries, lead dross, lead scrap, and other lead bearing material into reusable lead alloy. The 13.7-acre Site is located in a rural and residential area of Rossville, Fayette County, Tennessee. An unlined landfill containing about 10,000 cubic yards (cy) of *blast slag* is located in the northern portion of the Site. In addition, about 6,000 cy of stockpiled slag is stored on Site in several deteriorating buildings. Lead-contaminated surface soil is located throughout the Site, and lead-contaminated subsurface soil is present in isolated portions of the Site.

The purpose of the Ross Metals groundwater RI/FS was to document the nature and extent of groundwater contamination, and to develop and evaluate remedial alternatives for treating groundwater, as appropriate. From 1999 to the present year, several rounds of groundwater samples were collected to help achieve this goal. The results of these sampling events indicate that both the nature and extent of Site-related groundwater contamination are very limited. The nature of the groundwater contamination is limited to lead, and the extent of the contamination is limited to the upper part of the Memphis aquifer (the aquifer nearest to the surface) in two small areas

located around monitoring wells MW-4/MW-21 and MW-19. No contamination was found in any of the 18 other monitoring wells sampled at any time from 1999 to the present.



The concentrations of lead observed in groundwater at MW-4/MW-21 over the past three years have ranged from 67 to 110 micrograms/liter ( $\mu\text{g/L}$ ) or parts/billion (ppb) and appear to be steadily decreasing with the lowest concentration having been observed in the last round of sampling. The concentrations of lead observed in groundwater at MW-19 over the past three years have been fairly steady, ranging from less than  $7.5 \mu\text{g/L}$  to  $21 \mu\text{g/L}$ . The Safe Drinking Water Act Action Level for lead is  $15 \mu\text{g/L}$ .

Because of the very limited mobility of lead in the subsurface, it appears that significant migration of lead from the surface to groundwater has not occurred at this Site. In addition, what little lead has managed to reach the Memphis aquifer has not migrated significantly far downgradient in the aquifer. With the concentrations of lead decreasing and the migration of lead observed to be very limited, it is apparent that the lead contamination in groundwater at the Site is being naturally attenuated. (Natural attenuation refers to the process of dilution,

dispersion, biodegradation, and/or irreversible sorption of contaminants in soil or groundwater).

## SUMMARY OF SITE RISKS

As part of the Remedial Investigation/Feasibility Study (RI/FS), an analysis was conducted to estimate the human health or environmental problems that could result if the groundwater contamination at the Site is not cleaned up. This analysis, known as a Baseline Risk Assessment, focused on the current and future human health and environmental effects from long-term direct exposure to the contaminants found at the Site.

EPA has concluded that the major risk to human health at the Site would be ingestion of contaminated groundwater containing lead. However, since no one presently obtains drinking water from the contaminated aquifer, no one is at risk at this time. In the future, if a drinking water well were installed within the contaminant plume, the levels of lead in the water would represent a health threat to child residents. Effects of great concern from low-level lead exposure are neurobehavioral effects and growth retardation in infants exposed while in the womb and children exposed after birth.

## SCOPE AND ROLE OF OPERABLE UNIT 2

This is the second of two planned operable units for the Site. The first operable unit addressed principal threat wastes at the Site. Principal threat wastes are those source materials considered highly toxic or mobile that cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. For the Ross Metals Site, principal threat wastes addressed under OU 1 include:

- 600 cubic yards of soil
- 8,200 cubic yards of sediment
- 6,000 cubic yards of stockpiled slag
- 10,000 cubic yards of landfilled slag

As previously stated, the OU 2 response action addresses only the cleanup of the contaminated groundwater. The cleanup of groundwater is proposed to prevent exposure to the contamination, and to restore this potential source of drinking water to its original state and would be carried out following the remediation of source materials mentioned above.

Based on new information, technical data, or public comments, EPA in consultation with the State of

Tennessee, may modify the preferred alternative or select another response action presented in the Proposed Plan and the Feasibility Study (FS) Report. The public is encouraged to review and comment on all alternatives identified.

## SUMMARY OF ALTERNATIVES

Remedial alternatives for contaminated groundwater at the Ross Metals Site are presented below. The alternatives are numbered to correspond with the numbers in the OU 2 FS Report.

**Common Elements.** Several of the alternatives include common components. For example, three of the remedies require the use of *institutional controls* (e.g., future land use restrictions, local zoning ordinances, or permitting requirements) are common components to all the alternatives other than no action. These resource-use restrictions are discussed in each alternative as appropriate. The type of restriction will need to be determined for the selected remedy in the ROD. Monitoring to ensure the effectiveness of the remedy also is a component of each alternative.

### Alternative G-1 **No Action**

Under this alternative, no action would be taken to remedy the contaminated groundwater. Existing groundwater wells would be sampled for the Contaminants of Concern (COCs) found in groundwater every five years for 30 years. Five-year reviews would be conducted to assess the ongoing risks to human health and the environment posed by the Site. The evaluations would be based on the data collected from the groundwater monitoring.

*Estimated Capital Cost: \$0*  
*Estimated Annual O&M Cost: \$52,000*  
*Estimated Present Worth Cost: \$52,000*

### Alternative G-2 **Monitored Natural Attenuation with Deed Restrictions**

This alternative would utilize natural physical, chemical and biological processes (i.e., natural attenuation) to restore groundwater to drinking water use.

*Estimated Capital Cost: \$57,000*  
*Estimated Annual O&M Cost: \$127,000*  
*Estimated Present Worth Cost: \$184,000*

### **Alternative G-3**

#### **In Situ Treatment**

Treatment walls involve the construction of permanent, semi-permanent, or replaceable units across the flow path of the contaminant plume. (In this case the “plume” is limited to two small areas located around monitoring wells MW-4/MW-21 and MW-19). As contaminated groundwater flows through the treatment wall, the contaminants are removed by physical, chemical and/or biological processes. Under this alternative, either a series of wells creating a treatment zone, or a treatment wall would be constructed to intercept contaminated groundwater. For this alternative, construction of a continuous permeable reactive barrier downgradient of monitoring well No. 21 is assumed. For Site contaminants, reactive media might include phosphates, ferrous hydroxide, ferrous carbonate, ferrous sulfide, magnetite, dithionite, zeolite, peat, humate, lignite, coal, or activated carbon.

*Estimated Capital Cost: \$700,000*

*Estimated Annual O&M Cost: \$1.3 million*

*Estimated Present Worth Cost: \$2 million*

### **Alternative G-4**

#### **Pump and Treat with Physical/Chemical Treatment**

This alternative consists of pumping contaminated groundwater from on-Site extraction wells or well points to an on-Site wastewater treatment system, and subsequent discharge to either a Publicly Owned Treatment Works or surface water. Inorganic contaminants could be removed from groundwater with a precipitation/coagulation/flocculation process. Precipitation is a widely used, proven technology for the removal of metals and other inorganics from wastewater. Generally speaking, precipitation is a method of causing contaminants that are either dissolved or suspended in solution to settle out of solution as a solid precipitate, which can then be filtered, centrifuged, or otherwise separated from the liquid portion. Coagulation/flocculation is the process that occurs when alum and other chemicals are added to water to form tiny sticky particles called “floc” which attract the dirt particles. The combined weight of the dirt and the alum (floc) become heavy enough to sink to the bottom during sedimentation. Other processes that could be used for the treatment of inorganics in the waste stream include ion

exchange, neutralization, and chemical reduction. During the remedial design phase, EPA will determine the most cost-effective technology for treating the groundwater.

*Estimated Capital Cost: \$350,000*

*Estimated Annual O&M Cost: \$440,000*

*Estimated Present Worth Cost: \$790,000*

### **EVALUATION OF ALTERNATIVES**

Nine criteria are used to evaluate different remediation alternatives individually and against each other in order to select a remedy. This section of the proposed plan profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration. The nine evaluation criteria are discussed below. The “Detailed Analysis of Alternatives” can be found in the OU 2 FS.

The EPA preferred alternatives for the Ross Metals Superfund Site, Operable Unit 2 is Alternative G2. Because of the planned excavation and offsite disposal of the source materials under OU1 and the limited and immobile nature of the groundwater contaminant plume, this alternative provides the best balance of the nine criteria that EPA uses to evaluate alternatives.

The Evaluation of Cleanup Alternatives Table on page 5 provides an analysis and comparison of the alternatives considered for the cleanup of groundwater at the Site using the evaluation criteria. The following information addresses two of the criteria (State of Tennessee and community acceptance) which are not presented in the evaluation table.

#### **State of Tennessee Acceptance**

The State of Tennessee has assisted EPA in the review of reports and Site evaluation. The State has tentatively agreed with the proposed remedy and is awaiting public comment before final concurrence.

#### **Community Acceptance**

Community acceptance of the various alternatives will be evaluated during the 30-day public comment period and will be described in the OU 2 Record of Decision for the Site.

EVALUATION OF GROUNDWATER CLEANUP ALTERNATIVES							
Alternative	Overall Protection of Human Health and Environment	Compliance with ARARs <sup>1</sup>	Reduction of Toxicity, Mobility and Volume (TMV)	Short-Term Effectiveness	Implementability	Present Net Worth	Ranked Preferable Alternative
G-1 – No Action	NO	YES	Mobility is reduced.	Does not achieve goals <sup>2</sup> 0 years	Routine monitoring. Readily implemented.	\$52,000	4
G-2 – Monitored Natural Attenuation with Deed Restrictions	YES	YES	Mobility is reduced.	Goals achieved.	Additional data review/collection may be needed to determine applicability of monitored natural attenuation.	\$184,000	1
				Assume 30 years			
G-3 – In Situ Treatment	YES	YES	Mobility, toxicity and volume are reduced.	Goals achieved.	Design-phase study may be needed to define treatment components.	\$2,000,000	3
				Assume 30 years			
G-4 – Pump and Treat with Physical/Chemical Treatment	YES	YES	Mobility, toxicity and volume are reduced.	Goals achieved.	Design-phase study may be needed to define treatment components.	\$790,000	2
				Assume 4 years (based on modeling completed during EE/CA; actual duration may be greater			

Notes:

<sup>1</sup> ARARs - Applicable or Relevant and Appropriate Requirement;

<sup>2</sup> Goals (prevent human contact and further degradation of groundwater).

### EPA's PREFERRED ALTERNATIVE

The EPA preferred alternative is Alternative G-2. Based upon current information, this alternative appears to provide the best balance among the nine criteria that EPA uses to evaluate alternatives. EPA has determined that the preferred alternative would be protective of human health and the environment; would attain the Site goals; comply with *Applicable or Relevant and Appropriate Requirements* (ARARs); and would be cost effective.

The preferred alternative consists of the following:

- Implementation of institutional measures to control future development and prevent installation of wells within the contaminant plume boundary by placing access and use restrictions on all properties within the contaminant plume boundary;
- Review/collection of hydrological, geochemical and microbial data as needed to establish use of monitored natural attenuation; and
- Development of monitoring program, including monitoring frequency and identification of a monitoring well network to confirm that contaminant mobility reduction or concentration reduction is proceeding at rates consistent with meeting cleanup objectives.

The total estimated construction costs associated with this alternative is \$ 57,000. The estimated Operations and Maintenance costs are \$ 127,000. The estimated total present worth cost is \$184,000.

### THE NEXT STEP: THE COMMUNITY'S ROLE IN THE SELECTION PROCESS

EPA solicits input from the community on the cleanup alternatives proposed for each Superfund site. **EPA has sent a public comment period from July 8, 2002 through August 7, 2002, to encourage public participation in the selection process.** The comment period includes a public meeting at which EPA will present the groundwater RI/FS Report and Proposed Plan, answer questions, and receive both oral and written comments.

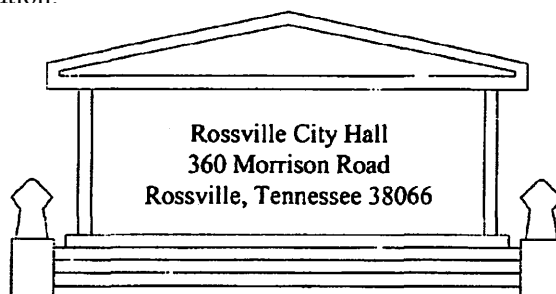
**The public meeting is scheduled for 6:30 PM, July 18, 2002, and will be held at Rossville Christian Academy in Rossville.**

EPA is required to extend the comment period, for a minimum of 30 days, upon receipt of a timely request to do so. At the end of the public comment period, a summary of all the questions and comments received from the public and EPA's responses will be provided in the Responsiveness Summary. The Responsiveness Summary is included in EPA's Record of Decision, which is the document that presents EPA's final selection for Site cleanup.

The public can send written comments to or obtain further information from:

**Beth Walden**  
Remedial Project Manager or  
Diane Barrett  
Community Involvement Coordinator  
U.S. EPA Region 4  
61 Forsyth Street, S.W.  
Atlanta, Georgia 30303-3104  
1-800-435-9233 **or**  
404-562-8814; 404-562-8489

The groundwater Proposed Plan and the RI/FS Reports have been placed in the information repository and Administrative Record for the Site. These documents are available for public review and copying at the following location:



## GLOSSARY

**Administrative Order on Consent:** A legal and enforceable agreement signed between EPA and Potentially Responsible Parties (PRPs) whereby PRPs agree to perform or pay the cost of site investigation.

**Applicable or Relevant and Appropriate Requirements:** Levels or standards of control for hazardous substances, pollutants, or contaminants specified by federal environmental laws and state environmental and facility siting laws.

**Blast Slag:** A by-product or waste that is generated during the lead smelting process.

**Comprehensive, Environmental Response, Compensation, and Liability Act (CERCLA):** A federal law passed in 1980 and amended in 1986 by the Superfund Amendments and Reauthorization Act. This law created a special tax that goes into a trust fund, commonly known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous waste sites. Under the Superfund program, EPA can either pay for site cleanup when the responsible parties cannot be located or are unwilling or unable to perform the work, or take legal action to force responsible parties to clean up the site or reimburse EPA for the cost of cleanup.

**Feasibility Study (FS):** A Feasibility Study evaluates different remedial alternatives for site cleanup and recommends the alternative that provides the best balance or protectiveness, effectiveness, implementability, and cost.

**Groundwater:** Water beneath the earth's surface that fills spaces among soil, sand, rock, and gravel. Precipitation, such as rain, reaches the ground and then slowly moves through soil, sand, gravel, and rock into small cracks and crevices below the ground surface. During a process that can take many years, groundwater has the potential of becoming a drinking water source.

**Institutional Controls:** Legal mechanisms to prevent human exposure to contamination remaining on hazardous waste sites.

**Monitoring:** The continued collection of information about the environment that helps gauge the effectiveness of a cleanup action.

**National Priorities List (NPL):** EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under Superfund.

**Operable Unit (OU):** Term for each of a number of

separate activities undertaken as part of a Superfund site cleanup.

**Parts Per Billion (ppb or µg/L):** A unit of measurement used to describe levels of contamination. For example, one gallon of a liquid in one billion gallons of water is equal to one part per billion.

**Parts Per Million (ppm or mg/L):** A unit of measurement used to describe levels of contamination. For example, one gallon of a liquid in one million gallons of water is equal to one part per million.

**Preferred Alternative:** EPA's selected best alternative, based on information collected to date, to address contamination at a site.

**Proposed Plan:** A fact sheet summarizing EPA's preferred cleanup strategy for a Superfund site, the rationale for the preference, and a review of the alternatives developed in the RI/FS process.

**Resource Conservation and Recovery Act (RCRA):** A law that established a regulatory system to track hazardous substances from the time of generation to disposal. Provides closure and post-closure minimum requirements for landfills.

**Record of Decision (ROD):** A public document that explains which cleanup alternative will be used at an NPL site and the reasons for choosing that cleanup alternative over other possibilities.

**Remedial Alternatives:** A list of the most technologically feasible alternatives for a cleanup strategy.

**Remedial Design:** An engineering phase that follows the Record of Decision when technical drawings and specifications are developed for the cleanup action at a Superfund site.

**Remedial Investigation (RI):** A Remedial Investigation examines the nature and extent of contamination problems at a site.

**Responsiveness Summary:** A summary of written or oral comments received by EPA during a public comment period.

**Superfund:** A term commonly used to describe the Federal program established by CERCLA.

**Superfund Amendments and Reauthorization Act (SARA):** Amendments to CERCLA enacted on October 17, 1986.

Your input on the recommended cleanup plan for the Ross Metals Operable Unit 2 is important to EPA. Comments provided by the public are valuable in helping EPA select the cleanup remedy for groundwater at the Site.

You may use the space below to write your comments, then fold and mail. Comments must be postmarked by midnight, August 7, 2002. If you have any questions about the comment period, please contact Beth Walden or Derek Matory at 1-800-435-9233.

[illegible]

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Phone \_\_\_\_\_

## COMMENT FORM

The public comment period for the Ross Metals Superfund Site Operable Unit 2 is from July 8 to August 7, 2002.

At the end of the comment period, EPA will review and consider all comments before making a final cleanup decision for the Site.

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*Fold on dashed lines, staple, stamp, and mail*

-----  
Name  
Address  
City/State/Zip

Place Stamp Here
------------------------

Beth Walden  
Remedial Project Manager  
U.S. EPA Region 4  
61 Forsyth Street  
Atlanta, Georgia 30303-3104

***B***



STATE OF TENNESSEE  
**DEPARTMENT OF ENVIRONMENT AND CONSERVATION**

Division of Superfund  
401 Church Street  
4th Floor, L & C Annex  
Nashville, TN 37243-1538

September 17, 2002

Ms. Beth Brown *Walden*  
Environmental Project Manager  
United States Environmental Protection Agency  
Region IV, Waste Management Division  
61 Forsyth St.  
Atlanta, GA 30303

Re: Concurrence for the Record of Decision Operable Unit 2 for the Ross Metals NPL site,  
Rossville, Fayette County, Tennessee, TDSF #24-501, cc 01.

Dear Ms. Brown:

The Tennessee Division of Superfund (TDSF) concurs with the draft Record of Decision for Operable Unit 2 at the Ross Metals Superfund site. We appreciate the cooperative relationship that has developed between our agencies.

Sincerely,

*James W. Haynes*  
James W. Haynes, P.E.  
Director  
Division of Superfund

cc: TDSF, NCO file  
TDSF, EAC-M file

*C*

PROPOSED PLAN PUBLIC MEETING  
18 JULY 2002  
ROSS METALS SUPERFUND SITE  
OPERABLE UNIT 2  
ROSSVILLE, TENNESSEE

ENVIRONMENTAL PROTECTION AGENCY  
Stephanie Yvette Brown  
Derek Matory  
Public Affairs Specialists  
Economic Redevelopment and  
Community Involvement Branch  
61 Forsyth Street  
Atlanta Federal Center  
Atlanta, Georgia 30303  
(404) 562-8450  
1(800) 654-7577

ORIGINAL

ALPHA REPORTING CORPORATION  
Debra A. Dibble, C.S.R., R.P.R.  
Suite 210-A - 100 North Main Building  
Memphis, TN 38103  
(901) 523-8974

1                   MR. MATORY: I guess we're going to go ahead  
2     and get started. I guess you all know why you're  
3     gathered here. It's for a further discussion on Ross  
4     Metals and our clean-up plans that we have for the  
5     site.

6                   We're going to try this make this -- this is  
7     a fairly small group, we're going to try to be fairly  
8     informal. We're going to have a presentation. We're  
9     going to make it -- I'm going to shoot through it  
10    because I'm sure most of you are familiar with the  
11    site, and I'll just be repeating a lot of stuff that  
12    you already know. But hopefully there will be some new  
13    information regarding what EPA is planning to do, what  
14    we've done, and what our status is at the moment.

15                  First of all, my name is Derek Matory. I am  
16    a current project manager for the site. I am  
17    temporarily replacing Beth Brown. I don't know if some  
18    of you've worked with her in the past. Stephanie Brown  
19    is our community relations coordinator, and she will be  
20    assisting us this evening. If you need more  
21    information and that sort of thing, she'll be more than  
22    happy to give you any kind of contact information that  
23    you may need.

24                  So, like I said, what I'll do is get started  
25    and get through my presentation, and if you have any

1 questions jot them down. I think this will take about  
2 15 minutes or so.

3 I'm going to sit down if that's okay.

4 As I said, in terms of this meeting we're  
5 going to go through a very, very short site history,  
6 let you know a little bit more about the Superfund  
7 clean-up process and, again, where we are.

8 This is probably, if you're a long-timer,  
9 this is the second time we've come to you with a  
10 proposed plan meeting. The first one was for the what  
11 we call Operable Unit 1, and that focused primarily on  
12 the soils and cleaning up the site, and taking out of  
13 the buildings, and that sort of thing. Looking into  
14 the extent of soil contamination, looking into the  
15 landfill behind the site, looking into the wetland area  
16 to the northeast of the site, that sort of thing. But  
17 at the time we did not have the time nor the resources  
18 to also take a look at the groundwater issue to see if  
19 that might also be of any concern that we needed to  
20 address long-term. And that's primarily what we're  
21 dealing with tonight, even though I can address any  
22 other questions you might have about what we're already  
23 doing.

24 What we're dealing with tonight is we're --  
25 we call this Operable Unit 2, and that, again,

1 primarily focuses on looking into groundwater, and any  
2 kind of impacts there might have been from past  
3 operations over at Ross Metals.

4 As you know, the site facility was where  
5 there was a secondary lead smelter operated up until  
6 1992. They primarily accepted lots of batteries for  
7 the most part, where they would crack it and recover  
8 lead from it. They also, to a certain extent, accepted  
9 waste from other sources that also had like scrap lead  
10 and the like.

11 In terms of the -- of what was left in the  
12 aftermath, the -- there was a lot of battery chips,  
13 waste material, sheet lead and the like.

14 Again, to back up, the Operable Unit 1, we  
15 covered that back in April of 1999, and, as I've said,  
16 it focused primarily on contaminated soils, slag,  
17 sediment, and when we came to you last time the  
18 clean-up options that were presented and adopted were  
19 to excavate all of the source materials. In other  
20 words, remove all of the soils that contained lead  
21 above a certain level, the same thing in terms of any  
22 kind of sediment or wet soils that would be in the  
23 wetland area, any kind of slag that would be buried in the  
24 landfill behind the Ross Metals site, and there was  
25 also some slag storehoused on the site as well.

1           And another goal of the -- of our clean-up  
2       was to restore the wetlands area. Again, that's to the  
3       north and northeast of the property.

4           In terms of what we've done since we came  
5       here the last time, we have at least started or  
6       initiated clean-up. And to be honest with you, all  
7       that has amounted to up until now is excavation of  
8       those source areas, excavation of the contaminated  
9       soils, sediment, slag, and, as you can see, these are  
10      the totals that we've come up with. Approximately  
11      30,000 tons of contaminated dirt is stockpiled now over  
12      at the site, and about 40,000 tons of slag. A lot of  
13      the buildings have been demolished and taken off-site.  
14      In terms of scrap metal, a lot of the old tanks and  
15      stuff, they've been taken off as well.

16           A lot of this was accomplished through this  
17      timeframe from November through February of this year.

18           MR. SAUNDERS: Question before you go  
19      forward?

20           MR. MATORY: Sure.

21           MR. SAUNDERS: You said stockpiled 30,000  
22      tons and 40,000 tons. Are those piles still there?

23           MR. MATORY: Yes.

24           MR. SAUNDERS: Okay. And what is the  
25      intended destination of those piles?

1                   MR. MATORY: The destination of the piles  
2     will be a permitted landfill. As to where it's going,  
3     I don't know at this point. But the idea is to take  
4     them off-site to a permitted landfill as non-hazardous  
5     waste. We're going to do treatment. We're going treat  
6     the soils on-site and then it will be taken off, taken  
7     or transported off.

8                   MR. SAUNDERS: Do you have a timetable for  
9     that?

10                  MR. MATORY: Yes.

11                  AUDIENCE: When is that?

12                  MR. MATORY: I guess one thing I should have  
13     stated here is the reason why we're only able to get  
14     through this time frame of November through February is  
15     really, to be honest with you, just funding issues.  
16     This is a clean-up that is currently being paid for by  
17     Federal tax dollars. And just the way the budget  
18     situation is set up, unfortunately we're being funded  
19     incrementally, and so that first phase was start-up. We  
20     have gotten additional funds appropriated, and the idea  
21     is that we should be out here starting again to at  
22     least start the treatment of those soils at least -- at  
23     the least by the first of September. It could be  
24     before then, but September seems to be a reasonable  
25     time frame to get our contractors back on board.

1           MR. SAUNDERS: Treatment of the soils that  
2     you're talking about, you're talking about stockpiles?

3           MR. MATORY: Well, it would be the soils and  
4     the slag material. By treatment, what we're going to  
5     do is to stabilize the soils primarily using a  
6     limestone-type mix, which would essentially stop the  
7     potential of the soils from leaching lead further into  
8     the landfill where they can be taken. The idea is that  
9     you want to have fairly inert material that will not  
10    leach and therefore contaminate that property as well  
11    once it's removed off-site.

12          MR. SAUNDERS: Now, the area that this soil  
13    and slag has been pushed into a pile from, the  
14    remaining surface area there, are you going to treat  
15    those soils as well, or do you consider that you have  
16    all of the contaminated soils in a pile?

17          MR. MATORY: Well, that's part of the work  
18    that's still going to be done. There's a lot of  
19    remaining concrete and asphalt out there that's going  
20    to be taken up as well. And there is a possibility  
21    that the soils, some of the soils -- at this point  
22    we're predicting or estimate there's about another  
23    15,000 tons of dirt underneath the existing concrete  
24    throughout that's also going to have to be taken away.  
25    So, again, one of those things. It's an estimate at

1       this point. We really don't know until you do more  
2       sampling and start your excavation and then analysis to  
3       gauge what the final volume is going to be. But at  
4       least our estimate is another 15,000 tons of soil in  
5       addition to that 30,000 tons that you see up there.  
6       (Indicating to screen.)

7               MR. SAUNDERS: Uh-huh.

8               MR. MATORY: So we're predicting that it's  
9       going to be approximately 45,000 tons of soil that are  
10      going to have to be treated in addition to the slag  
11      material. So that's where we are.

12              MR. SAUNDERS: Treatment takes how long  
13      usually?

14              MR. MATORY: Well, that's later on in the  
15      presentation. We're thinking it's going to be  
16      approximately nine months.

17              MR. SAUNDERS: All right. I'll stop  
18      questioning.

19              MR. MATORY: That's fine.

20              Again, this is a layout of the site. If  
21      you're familiar with the property, this was how the  
22      facility used to be laid out. You've got the sewage  
23      treatment plant here to the west. Again, this is the  
24      old -- the landfill area where a lot of the blast slag  
25      was placed. That is now stockpiled back in this area.

1 And, of course, the wetlands are to the north,  
2 northeast of the Ross Metals facility, and we did do  
3 some excavations out in this area as well. Not a whole  
4 lot, but there was some. It was pretty much limited to  
5 about six inches in depth, so a half a foot. Not a  
6 whole lot in terms of vertical migration of lead into  
7 the wetlands, but it was mainly in those areas that  
8 were susceptible to storm water drainage from the site,  
9 primarily from the landfill out into the wetlands, and  
10 then there are I believe some low spots out here that  
11 might have drained out into the area as well.

12 This is a not-too-good aerial photo. I  
13 pulled this off of our web site to give you some idea  
14 of what the property used to look like, and, again, a  
15 lot of these buildings in the interior are now gone.  
16 There are sheet metal buildings that -- we've removed  
17 them. There is slag material that is warehoused under  
18 some of the buildings currently. I believe this one is  
19 still intact, and I believe this one is as well.

20 Most of this towards the center of the  
21 property is now gone, and, like I said, those areas  
22 back here, there are a lot of excavations back here,  
23 and then to a lesser degree in the wetland areas, which  
24 is off the screen here.

25 Again, these are some photos of several

1       years ago before any of the clean-up activity started,  
2       or at least the clean-up of the site.

3               More -- see, like a lot of the tin buildings  
4       are in disrepair.

5               More of the buildings.

6               And this is more of what it looks like now.  
7       We've got a lot of the material stockpiled.

8               To the extent we can we've tried to tarp  
9       them to minimize any kind of debris being blown away in  
10      the wind and that sort of thing.

11              Again, more of the stockpiled material. The  
12      slag material over here underneath the shed.

13              Just another vantage point. There's someone  
14      standing on the pile of contaminated soil looking back  
15      towards the west towards the sewage treatment plant.

16              And again, this is more of looking north.  
17      You can see towards the interior of the -- as I said, a  
18      lot of the buildings have been taken down and removed,  
19      and the ones that are left are usually just -- are  
20      serving as a storage shed for the slag material that's  
21      left.

22              This is the old landfill area. You can see  
23      some of our monitoring wells. Here's one here, here's  
24      another, and there's another. These are some of the  
25      wells that we relied on to give the information for

1     this current sampling. We looked at the groundwater on  
2     the site.

3             Again, where the landfill area started  
4     transitioning to the wetland area. This is sort of the  
5     wetland area where it looks like there was a depth of  
6     about half of a foot. A lot of this soil material  
7     taken away.

8             And again, another vantage point of some of  
9     the area where the sediment soils are taken out.

10            Again, that's one of the monitoring wells  
11     right there.

12            And as stated earlier, we presume that,  
13     assuming there are no other glitches, at least with  
14     funding, we're pretty sure that the funding is there to  
15     get started with the next phase of the work, which,  
16     again, would be to stabilize a lot of the stockpiles of  
17     soil that you've seen and start to take them off-site  
18     as well, and to start to look at removal of the  
19     concrete and asphalt that's also remaining on the  
20     property, and to excavate the dirt that is contaminated  
21     underneath the parking lot, take that out as well.

22            And, you know, I've left myself a fairly big  
23     time frame here, but the contractor awarded now thinks  
24     it's going to be about nine months. But, you know,  
25     with the weather and other considerations, just things

1       can be six to 12 months.

2               In terms of, again, this environmental  
3       investigation which focused on the groundwater of the  
4       site, the goals, these are -- whenever we do a  
5       clean-up, this is pretty standard. This is what we  
6       look at for the ideas to define the nature and extent.

7               By nature, that means get an idea of what  
8       contaminants are present and into what loads. In other  
9       words, just how high the levels of contamination are.  
10      And the extent, that basically just tells you how far,  
11      how deep, how wide, that sort of thing.

12              Also, another goal is to identify any type  
13      of risk to human health and the environment. All the  
14      time you don't find any, but it is part of the  
15      investigation.

16              And the FS part is the -- this is remedial  
17      investigation/feasibility study. The feasibility study  
18      looks at coming up with viable alternatives for  
19      clean-up. We look at a number of factors, which I'll  
20      cover later on in the slide presentation.

21              In a nutshell, this is what we've found.

22              Lead was pretty much the predominant and  
23      just about the only contaminant we saw in the  
24      groundwater at all.

25              We did not find any migration of the lead

1       contamination. It was all pretty much localized to two  
2       well locations. Another finding is that it's pretty  
3       much limited to the upper part of the Memphis sand  
4       aquifer, which is basically we counted water in the 10  
5       to 20 feet down?

6               MR. ENGLISH: I'm not real sure. I'd have  
7       to look it up.

8               MR. MATORY: I hope you can see this. Can  
9       everybody read this one? I can make it a little  
10      larger.

11              Again, the -- in terms of this map, the red  
12      circles represent monitoring well locations, and there  
13      was one well that was abandoned because it was damaged.

14              In terms of our assessing the groundwater,  
15      the state of the groundwater underneath the Ross Metals  
16      property, looking at -- we relied on all of these wells  
17      out there. I believe there are about 21 of them.

18              They're primarily in that 20- to  
19      30-foot-in-depth range. I think there were a few that  
20      may have been a little deeper than that, but that was  
21      pretty much where the aquifer of concern was  
22      encountered.

23              And this hatched mark indicates where it  
24      looks like there was a problem. Here and here.

25              At this particular location, this is where a

1 lot of the battery cracking activities occurred or took  
2 place, and that explains why we do see some  
3 contamination here.

4 At this particular location we think that  
5 just like storm water drainage and surficial  
6 contamination and the like. It looks as if there's a  
7 conduit when this well was installed, between that and  
8 the damage that occurred, it looks as if contamination  
9 could have migrated down into the subsurface via that  
10 mechanism.

11 This is another vantage point of what we  
12 think is going on. Again, this is beneath the area  
13 where the old battery cracking facility or building  
14 was, and even more limited would be the contamination  
15 where there was a well that was damaged. And it looks  
16 like there's probably storm water drainage that went  
17 down the interface of the well into the subsurface.

18 MR. ENGLISH: Well is at 20 to 30 feet deep,  
19 and the water is like four and five feet deep, so it's  
20 real shallow.

21 MR. MATORY: Okay.

22 Again, that's an aerial vantage of what's  
23 going on. Fairly localized. Not what we consider to  
24 be a pervasive groundwater plume by any stretch of the  
25 imagination. It's pretty much at these particular

1 locations. Not really impacting any drinking water  
2 well fields or anything of that nature. So it's just  
3 limited to on-site.

4 And again, another vantage --  
5 cross-sectional vantage point. We've got the facility  
6 surface here, dirt, and then we start getting to the  
7 sand formations underneath that.

8 In terms of for remedial investigation, the  
9 idea is to assess what impacts there are to  
10 groundwater, and it doesn't look like there really is  
11 any here. And we're basing that on the fact that we  
12 just didn't see any detection of any significance in  
13 any of the wells except for those two that I indicated.  
14 So it doesn't look like there's any kind of significant  
15 migration from the site or down-gradient of the site in  
16 terms of --

17 Another way of assessing whether or not  
18 there are any kind of impacts is we look at drinking  
19 water standards. In other words, what's legally  
20 allowable in your drinking water. And for lead, which  
21 this is the abbreviation for lead, the Pb, it's 15  
22 parts per million.

23 A. That amount is -- yes, sir.

24 MR. BAILEY: Do you have any idea which way  
25 the underground water flows?

1 MR. MATORY: Yes. What was your name again?

2 MR. BAILEY: James Bailey.

3 MR. MATORY: Mr. Bailey wants know the  
4 prevailing groundwater direction of the site. What  
5 we're able to find is that from when you're at the rear  
6 of the Rose Metals facility it tends to go northward,  
7 as you approach the wetland area to the rear of the  
8 property it tends to go in a more northwesterly  
9 direction. So back again at the front of the property  
10 it tends more northward, and as you go to the back it  
11 looks like it veers more towards the west.

12 I believe the terms of where the -- I'm  
13 assuming it's dictated by the Wolf River in this  
14 location, so a lot of these official wells, you go  
15 towards where the river is basically.

16 So, again, in terms of our assessing whether  
17 or not there are any significant impacts at the site,  
18 again, it doesn't look like there's any kind of  
19 pervasive migration of contaminant.

20 We also looked at the nature of the  
21 contamination or the amount that was present in the  
22 wells that we defined. Using 15 parts per billion as a  
23 standard, this is pretty much what we found.

24 Again, those two wells, 19 would be the one  
25 that's underneath the former battery cracking area, and

1     this is the well that was damaged. Actually, I have  
2     those flipped. The well that was damaged we saw these  
3     kind of levels, from non-detect, in other words, there  
4     were over -- when we ran the analysis on the water we  
5     didn't see anything up until 21 parts per billion.  
6     That's somewhat over the MCL, but we did see some  
7     significant evidences of the MCL underneath the battery  
8     cracking building, and that's what we looked back  
9     through the data, and it was from 57 to about 100, at  
10    96 parts per billion.

11             Again, this is micrograms per liter, is  
12    another way of saying parts per billion.

13             One other point that should be made or  
14    noted, in the rest of the wells, in other words in the  
15    other nineteen wells that are on-site, we really didn't  
16    see anything. It was from non-detect to about five,  
17    which, again, is well under the MCL, which is what we  
18    would think there would be a problem about drinking  
19    water.

20             One other thing to understand in terms of,  
21    again, using the safe water drinking number as an  
22    action level, the idea here is that -- well, the way  
23    EPA looks at groundwater is if it has a certain yield  
24    of, I think the yield would be like 100 and -- I want  
25    to say 150 -- wait, 150 gallons per day, then it's

1 considered viable or potential drinking water. In  
2 other words, someone could theoretically sink a well or  
3 construct a well at that location and be able to  
4 retrieve drinking water from it. Therefore, when we  
5 looked at assessing groundwater impacts, we use this 15  
6 parts per billion in terms of -- when we look at  
7 lead -- as a rationale for -- that even though the  
8 groundwater at that location might not be -- actually  
9 be used for that purpose, we evaluated as if it were,  
10 because it has the characteristics of water that -- of  
11 an aquifer that can yield enough in order to support a  
12 house or a small drinking water well.

13 In terms of the Alternatives that we looked  
14 at, again, the -- our evaluation process requires that  
15 we look at the impact of doing nothing, and that's what  
16 we call the No Action.

17 The second Alternative that we evaluated is  
18 monitored natural attenuation with deed restrictions.  
19 And by deed restrictions, that would mean that we would  
20 work with the State, local government, to ensure that  
21 there is a deed restriction placed on that property  
22 that says, Thou shalt not install wells, drinking water  
23 wells on this property.

24 The third Alternative we looked at was  
25 in-situ treatment, which essentially involves

1 installing some type of a barrier in the ground that  
2 would be perpendicular to the prevailing groundwater  
3 flow, with the idea that as the groundwater flows  
4 through this barrier, that the contaminants would be  
5 removed.

6 And the other that is used, but not  
7 necessarily in this situation, would be pump and treat.  
8 And that's where the groundwater would be actively  
9 recovered and would be treated through some mechanism,  
10 that in this case would remove the lead from the water,  
11 if that were a viable option.

12 These are the different criteria that each  
13 one of those four alternatives were compared to to end  
14 up with one of them. These are the criteria that we  
15 looked at. We looked at whether or not at the end of  
16 the day, when the clean-up is done, will the remedy  
17 be -- would it be protective. In other words, would  
18 there be any -- would there be any remaining  
19 contamination? And in this case, at the end of the day  
20 would there be any exceedances of that 15 part per  
21 billion that I showed you earlier. The other would be  
22 compliance with ARARs, which is an abbreviation to  
23 Federal and state regulations that, in this case,  
24 again, that would be that safe drinking water number,  
25 would be the ARAR of importance here.

1                   We look at long-term effectiveness and  
2     permanence. In other words, when we're done with the  
3     clean-up, is it going to be something that's not going  
4     to come back? Is it going to be a permanent clean-up?  
5     The clean-up should also reduce toxicity, the mobility  
6     of the contamination, and also the overall volume.

7                   Short-term effectiveness deals with more of  
8     when you've got construction ongoing, like for the  
9     clean-ups not to be hazardous to the workers that are  
10    conducting the clean-up.

11                  And then the implementability speaks to just  
12    how easy it is to actually achieve your goal. I mean,  
13    certain things don't work in certain situations, and  
14    certain things work better in certain situations than  
15    others, so this implementability, that's where we look  
16    at it.

17                  Of course we always look at costs in terms  
18    of just how much things are going to be in terms of the  
19    amount of funds that would have to be extended --  
20    expended rather.

21                  We work with the State to make sure they're  
22    on board with whatever decisions are arrived at.  
23    Sometimes there is not agreement, but we try to reach  
24    some mutual understanding.

25                  And, of course, the community acceptance is

1 part of why we're here now, is to make sure that we  
2 incorporate the community's concerns into whatever the  
3 final clean-up is.

4 Again, we don't always do exactly what the  
5 community says, but we like to make sure we're at least  
6 aware of the concerns, and then to the extent we can we  
7 do want to incorporate them into whatever final  
8 clean-up we come up with.

9 So of the four clean-up options that were  
10 looked at, the one that we feel is appropriate for Ross  
11 Metals, given the fact that there really is little or  
12 no contamination of the groundwater, would be that of  
13 monitored natural attenuation with deed restrictions.  
14 And again, the idea behind the monitored natural  
15 attenuation is that it is essentially to let mother  
16 nature take care of the problem.

17 In other words, what we're seeing in the  
18 groundwater, at those wells, at those two wells that  
19 were identified, is lead.

20 Over time lead tends to absorb or adhere to  
21 soil particles, so as the water -- so as the water  
22 within the aquifer moves through it, over time you  
23 would expect more of the lead that's currently in the  
24 groundwater to absorb into the soil particles that's in  
25 the subsurface. And we feel that over time the

1 groundwater contamination at those two wells will  
2 pretty much take care of itself.

3 Another component of this monitored natural  
4 attenuation is to make sure that we continue to come  
5 back out on regular intervals and sample the existing  
6 wells at the site to make sure that, one, that the  
7 problem is not changing to the extent that there is  
8 further migration occurring, and also, just to make  
9 sure that this monitored natural attenuation idea, that  
10 we are indeed seeing a reduction in the groundwater  
11 levels over the long-term.

12 And again, the other facet of this clean-up  
13 option is deed restrictions, and which we'd actually  
14 place a deed restriction on the land at Ross Metals  
15 that would indicate that this property would not be  
16 appropriate for any kind of a siting of any kind of  
17 well fields or anything in the future. Municipal well  
18 fields or even private wells.

19 This present worth cost is what we think, or  
20 rather what we predict this clean-up alternative will  
21 cost over a 30-year period, with the up-front cost  
22 being about \$50,000. And a lot of that is essentially  
23 just analyticals, to make sure we have the appropriate  
24 parameters so that we can, over the long-term, compare  
25 to make sure that we are seeing a reduction in the

1     contaminant levels.

2                   And the remainder of this would be when we  
3     look at -- when we come back in the future, like I  
4     said, at five-year intervals basically, to resample the  
5     wells, I guess these would be additional analytical  
6     costs that would be incurred over a 30-year period.

7                   Again, this public meeting is just to  
8     satisfy the requirements for public community  
9     participation in the clean-up process.

10                  There's a 30-day comment period which was  
11     initiated when we mailed out the Proposed Plans that I  
12     assume a number of you received in the mail.

13                  If there is a need for an extension, we can  
14     grant a 30-day extension. Let's say if you want more  
15     time to evaluate the clean-up options that we're  
16     proposing and you want to comment on, you can request,  
17     and we will grant, a 30-day extension to this time  
18     frame here of July 8th through August 7th.

19                  Repository location?

20                  MS. BROWN: It's at the Rossville City Hall.

21                  MR. MATORY: The administrative record will  
22     contain all of the documents that we relied upon in  
23     terms of coming up with the clean-up -- with coming up  
24     with this clean-up alternative for the groundwater here  
25     at Ross Metals. It will contain the Remedial

1 Investigation report/Feasibility Study report, and Risk  
2 Assessment report. There are going to be three  
3 documents similar to this in the repository.

4 And I don't think I went on too long, so  
5 again, if there -- if this would be an appropriate time  
6 if you have questions, or any more questions about  
7 anything I've said, or just anything maybe I didn't  
8 address, any of your concerns.

9 AUDIENCE: Yeah. When you said contaminated  
10 soil, how deep will the excavation go?

11 MR. MATORY: Well, in the -- right off the  
12 top of my head, the -- I know that the wetland area,  
13 that they only went down about a half a foot. In terms  
14 of the landfill area, I'm not really sure, but I know  
15 that there was a lot of slag material that was buried  
16 out there. So really, depending on just how big those  
17 chunks of slag were, that would probably dictate just  
18 how far down they went.

19 There's not a whole -- I guess -- I walked  
20 out there. It does not look like there are any really,  
21 really deep -- any real deep excavations, thinking of  
22 anything off-hand.

23 MR. ENGLISH: No. The only thing, there  
24 might be a deep excavation might have been a slag, and  
25 they were mostly like six inches to a couple of feet,

1     some places a little bit more. And where they pull  
2     those concrete slabs out there will be some deeper  
3     excavations there, just depending on the slag. The  
4     only area I know that had deeper excavations were in  
5     the slag area.

6                 MR. MATORY: For most of you that don't  
7     know, this is Jordan English, works with the State of  
8     Tennessee. My counterpart in the state's Superfund  
9     program.

10                And again, the reason why you would not  
11     expect to see lots of contamination, you know, any  
12     really, really deep depth is because, again, lead tends  
13     to adhere to soil particles, therefore it doesn't  
14     migrate down as far as. Whereas if you had a  
15     situation -- let's say I -- I'm sure you've seen a lot  
16     of old gas stations that have been cleaned up, and  
17     you've seen the tanks that are removed, and that  
18     gasoline just pretty much goes through the dirt. It  
19     does not adhere to the soils at all. It just pretty  
20     much just goes straight down through it. So, again,  
21     you're -- we're lucky in the sense that with lead, the  
22     characteristics of the lead is to adhere to the soil,  
23     so, therefore, as it does so, it just doesn't go down  
24     very far.

25                AUDIENCE: This doesn't have any affect on

1 the aquifers, the residents in the area, when you're  
2 transporting this stuff out of the area? Do you have  
3 the trucks that's carrying this transportation with it,  
4 will they be shielded while they're transporting it  
5 through the -- even though, you know, you digging lead  
6 and all of that stuff?

7 MR. MATORY: Right. Well, I mean, the idea  
8 will not be to have dust flying off the trucks. I  
9 mean, I'm sure we'll take all precautions there where  
10 we can to not allow it to happen

11 MR. ENGLISH: It's going to be treated first  
12 before it does go off site.

13 MR. MATORY: Still, you don't, even if it's  
14 treated, you don't want the type of dust flowing.

15 MR. ENGLISH: It will be tarped.

16 MR. MATORY: They will be packed in trucks  
17 and they do tarp it.

18 Now, can I say definitively you won't see  
19 any dust? No, I can't say that, but the idea is to  
20 minimize it to the extent you can. And, of course, if  
21 you see instances where it's -- where it's really bad,  
22 or if you think -- or if you think that they're not  
23 tarping the trucks as they roll out, then that's where  
24 you can contact us, either myself or even Jordan  
25 here -- he's out of the Memphis office -- to let us

1 know what's going on.

2 And while the excavation, I mean, while the  
3 transportation is going on, either he or I or Beth  
4 Brown, one of the three of us will be out here with  
5 some regularity. So, again, if you don't want to call  
6 us, you can always snag one of us and let us know.

7 MR. ENGLISH: Tell me if I'm wrong, but I  
8 think the remedy would be for any dust that you might  
9 see, they'll wet it down more than likely. That should  
10 not present a problem, simply to keep the dust down.

11 MR. MATORY: But, again, there probably will  
12 be some dust even as they're scooping the dirt up into  
13 the trackhoes. There's probably going to be some dust  
14 flying around, but the idea is to keep it wet to the  
15 extent you can.

16 Yes, sir.

17 AUDIENCE: Is that ordained \$184,000 going  
18 towards moving all of that contaminated?

19 MR. MATORY: No, sir. The --

20 MR. ENGLISH: You wish.

21 AUDIENCE: That's what I was thinking. I  
22 didn't think it could --

23 MR. ENGLISH: This is the inexpensive part  
24 of this.

25 AUDIENCE: I have a question.

1 MR. MATORY: One second and I'll get to you.

2 The question was whether or not this  
3 \$184,000 is to pay for the 70,000 tons of dirt.

4 MR. SAUNDERS: 85

5 MR. MATORY: 85,000 tons of dirt.

6 No, sir. That's the separate -- is a  
7 separate pot of money. And, again, that's being  
8 addressed under what -- for the way we look at it is  
9 the Operable Unit 1, and this is Operable Unit 2, which  
10 addresses groundwater.

11 In other words, trying to assess whether or  
12 not those little spots of those two wells where there  
13 was groundwater contamination, or at least evidence  
14 that the lead has made it into the groundwater, it's  
15 just assessing that over 30 years. So, in other words,  
16 like I said, this 184, we arrived at that number,  
17 there's going to be an up-front cost of about \$50,000,  
18 and that's just analyticals, to make sure that we have  
19 all of the appropriate parameters collected so that  
20 over the years we can have something to gauge any kind  
21 of progress, or where the groundwater is. Hopefully  
22 the level, the numbers will go down, but you have to  
23 collect the appropriate parameters on the front end.

24 And in terms of the cost of carting away all  
25 of the soils, they'll do treatment on-site. It's

1     probably going to be somewhere between a total of six  
2     to seven, seven and a half million dollars. So that's  
3     a big budget item, and this particular part is a fairly  
4     small budget item, relatively speaking. 184 is a lot  
5     to me, but relatively speaking it's not a big cost to  
6     the clean-up.

7                     Yes, ma'am.

8                     MISS LINDA: The rainwater that runs off of  
9     the stockpile that you have there now, that comes over  
10    into my yard. I'm next door to it. Is it  
11    contaminated?

12                    MR. MATORY: The --

13                    MISS LINDA: You know, the run-off water.  
14    And the next question is, is it hazardous to children?

15                    MR. MATORY: Okay. The first question,  
16    assuming it's rainwater that's running off the tarp,  
17    the idea is it should not be coming in contact with the  
18    soils there underneath the tarp.

19                    Now, if there are some areas that are  
20    exposed to the rainwater, and that's running on your  
21    property, that may be a problem.

22                    And in terms of is it of concern with  
23    children, yes, in that -- I don't know if you have  
24    little kids, but if they're in the --

25                    AUDIENCE: Ages three to seven

1                   MR. MATORY: That's the ages where they're  
2 out playing in the dirt. So, if -- that's something we  
3 need to take a look at. I mean, if it's -- if we've  
4 got storm water that's going into your yard, that  
5 should not be occurring and we need to address that.

6                   MISS LINDA: Well, it's coming in there.  
7 It's happening, and it always has. Like a lake.

8                   MR. MATORY: So make sure I get your -- have  
9 you discussed that at all with anybody in the past?

10                  MISS LINDA: Yeah, in the past. You know, I  
11 think it was back in '92 to '94, they came and they dug  
12 up my yard.

13                  MR. MATORY: I mean, but the stockpiles. I  
14 mean, there being an ongoing problem with that.

15                  MISS LINDA: Just that water run from there.

16                  MR. MATORY: I'm saying have you talked to  
17 anybody about that?

18                  MISS LINDA: No.

19                  MR. MATORY: I just wanted to make sure that  
20 you haven't spoken to anybody and they're looking into  
21 it. We'll talk to you after the meeting.

22                  AUDIENCE: Have you all done storm water  
23 monitoring, or are you currently monitoring storm  
24 water?

25                  MR. MATORY: No, we have not.

1                   AUDIENCE: No storm water testing, or any  
2    thing such as that?

3                   MR. MATORY: I mean, again, the idea is that  
4    for the most part we've got what we consider to be the  
5    contaminated soils stockpiled and covered with tarp, so  
6    to the extent that, you know, comparing now versus  
7    before we did that, I would assume that the -- that if  
8    there is any kind of storm water impact, it's  
9    negligible compared to what it used to be, and then  
10   what it will be once we get the work underway.

11                  But the next step is to, again, move to the  
12   next phase of our work, and to get the  
13   solidification -- I mean the stabilization activities  
14   underway so we can get that material transported off  
15   the site all together.

16                  AUDIENCE: Question.

17                  AUDIENCE: Like she was talking about. Is  
18   her -- have they tested her yard to see?

19                  MR. MATORY: I will have to defer to you. I  
20   mean, I'm pretty new to this project, so I don't know.  
21   You said they did look at your yard some years back?

22                  MISS LINDA: Back, I think it was '92 or 93,  
23   they dug my yard up, the complete yard. They dug it up  
24   and then they refilled it in. And that's when I had  
25   problems, that they didn't fill it back up where -- at

1 the level that it was, so now water just dumps in there  
2 and just stand. Everybody in the town knows it just  
3 floods out because they didn't put enough dirt back in  
4 for the water to run off. It just runs back down into  
5 my house after putting dirt back in, And I've had  
6 problems since they did it.

7 So what I'm saying is water is running in  
8 the yard. So the reason I was asking, if you've got a  
9 stockpile there, and when it rains, you know, and it's  
10 a lower area, it floods there. So the water, instead  
11 it of coming back in the yard -- it's defeating the  
12 purpose of digging it up.

13 MR. MATORY: I agree. That's something that  
14 when we get back involved in terms of being on-site  
15 again we'll make sure that your yard is looked at,  
16 because, I mean, we're taking away a lot of remaining  
17 dirt at the site. If there's some more on your  
18 property, there's no reason why we can't take that as  
19 well. I mean, what's on your site on your property is  
20 going to be a drop in the bucket compared to what's  
21 still left underneath the concrete.

22 AUDIENCE: Question.

23 MR. MATORY: Yes, sir.

24 AUDIENCE: The clean-up of the soil and  
25 slag, to what degree is the treatment intended to

1       decontaminate those soils?

2                   MR. MATORY: The treatment is more of a  
3       fixation. In other words, the idea is that you mix the  
4       soils with other inert materials that make the lead  
5       content of the soils so they won't leach out anymore  
6       under -- in other words, we're going to take it  
7       off-site. You don't want to make it -- to recreate a  
8       problem in another location, so the idea is to make  
9       sure that the soils are -- that the lead in the soils  
10      are fixated so that it does not leach. In other words,  
11      in rain conditions. So it's less of a treatment. In  
12      other words, the contaminant or the lead is not  
13      destroyed, it's not removed from the dirt, it's  
14      still -- the lead will still be in the dirt, it just  
15      won't be water soluble. It won't run out anymore.

16                  AUDIENCE: I see. And to what --

17                  MR. MATORY: Do you agree with that?

18                  MR. ENGLISH: Yeah.

19                  AUDIENCE: And to what class disposal  
20      facility would you have to go to in order to dispose of  
21      this?

22                  MR. MATORY: When we're done with the  
23      treatment, it would be considered non-hazardous at that  
24      point, so the plan is to take it to Subtitle D  
25      landfill.

1                   MR. ENGLISH: I think the class, I think the  
2    class that we would be able would be special waste, but  
3    it can go to, I think, go to subtitle D.

4                   AUDIENCE: Like industrial chemical type?

5                   MR. ENGLISH: Not really.

6                   AUDIENCE: You all are not going to go to a  
7    regular sanitary landfill. Is it --

8                   MR. ENGLISH: I'm not real sure. It would  
9    be a subtitle D. I don't know if it would necessarily  
10   be a sanitary landfill. But the difference is it would  
11   go to a location where it can be managed, and watched,  
12   and would be out of the flood plain like it is now. It  
13   wouldn't be in an area where it could continue to  
14   leach. It would be fixed, stabilized, fixated.

15                  MR. MATORY: Yes, sir.

16                  AUDIENCE: The wells. There will be wells  
17   on this property? After you come in and do what you  
18   need to do, will there be wells monitoring on that,  
19   wells there all the time for a certain period of time  
20   or what?

21                  MR. MATORY: Well -- I think the question is  
22   whether or not we're going to leave the wells --

23                  AUDIENCE: Yeah.

24                  MR. MATORY: -- that are there that we used  
25   for this study? If they're going to remain.

1           To be honest with you, it really depends on  
2   the long-term usage of that property. In other words,  
3   once we're done with the clean-up, the City of  
4   Rossville may want to use that property for something,  
5   so there's a possibility that some of the wells will be  
6   left out there. It might be in the footprint of  
7   whatever construction needs to go on out there. So  
8   some of them might be taken out.

9           Some of the wells that we've -- especially  
10  the ones where we know there's nothing to see, those  
11  will be candidates or likely candidates to be  
12  abandoned. The ones where we are seeing the problem,  
13  those two, those would be less likely to go anywhere in  
14  the short-term. Is that --

15           AUDIENCE: That's the question.

16           MR. MATORY: Yes, sir.

17           AUDIENCE: Right now who owns that land?  
18  You all? The government? Rossville? Or what?

19           AUDIENCE: Fayette County.

20           MR. ENGLISH: You. Everybody.

21           MR. MATORY: As far as I know, Ross Metals  
22  is no longer a commercial entity, and so I'm assuming  
23  that they -- so no one -- so I'm assuming that property  
24  was reacquired by the county, so I guess technically  
25  it's a public piece of property.

1                   AUDIENCE: When you all get through with it,  
2 it turns over to the county or the city, right?

3                   MR. MATORY: Yes, air.

4                   AUDIENCE: When you all get through with the  
5 cleaning up of it?

6                   MR. MATORY: Yes.

7                   MR. ENGLISH: It's possible -- tell me to  
8 shut up if I'm wrong here, but it's possible that there  
9 could be some use of it before it's completely cleaned  
10 up. In other words, before the groundwater gets  
11 completely cleaned, there's also a possibility it will  
12 be utilized.

13                  AUDIENCE: Last question. When is the time  
14 frame that you all are seeing for the last phase of  
15 clean-up? For it to end?

16                  MR. MATORY: In terms of the dirt moving,  
17 again, the time frame my contractor is giving me is  
18 nine months from beginning to end for this work.

19                  In other words, to do these stabilization  
20 activities with the piles that are out there now, to  
21 transport them off-site, to do the remainder -- get the  
22 remaining concrete out of the parking lot, to get all  
23 of that up, to remove the dirt underneath the parking  
24 lot, we have some plans to restore the wetland area,  
25 and that's going to essentially just be planting some

1 of the native species of trees back out there, some of  
2 those that were taken out or damaged when we did our  
3 excavations. So his time frame is nine months. Now --  
4 so it could be plus a couple of months depending on  
5 other factors, but that's what we think it's going to  
6 be.

7 AUDIENCE: Okay.

8 MR. MATORY: Funding from EPA looks as if  
9 that's going -- we've gotten a portion of it. We've  
10 got three million of the estimated six and a half  
11 million that we're going to need. We've got that part  
12 already funded, and we're promised by -- we're a  
13 regional office, but we're promised by our  
14 headquarters, EPA Washington, that they would provide  
15 the balance of the clean-up in our next fiscal year,  
16 and that starts -- our fiscal year starts, in other  
17 words our accounting year, starts in October. And so  
18 there will be some time before the -- in that  
19 October-December time frame we would expect to get the  
20 remainder of the funds to complete the clean-up  
21 altogether.

22 AUDIENCE: And at that time you would turn  
23 it back over to the county?

24 MR. MATORY: Yes. I mean, again,  
25 technically it's probably already owned by the county,

1       because I'm sure they've acquired the property just  
2       simply because the taxes aren't being paid on it. So  
3       technically the county already owns it.

4               THE COURT: I don't know whether they've  
5       foreclosed on it or not.

6               AUDIENCE: They owe a lot of money to the  
7       county. Probably 15 or 16,000.

8               MR. MATORY: Yes, sir.

9               AUDIENCE: Now, how are you all just  
10      cleaning up -- what are you doing? How many acres?  
11      How far that go?

12              MR. MATORY: Okay. One more time?

13              AUDIENCE: The clean-up you all are doing  
14      now, to what end are you going to? You get on the  
15      Ross Metals or only on Ross Metals?

16              AUDIENCE: Spare lives up the road about  
17      five or six houses.

18              MR. MATORY: I'm having trouble hearing from  
19      the machines.

20              AUDIENCE: He's asking how big an area  
21      around are you going to clean up, or if it's just going  
22      to be Ross Metals.

23              MR. MATORY: I'll try to get one of those  
24      other maps back up here. Sorry I couldn't understand  
25      you, sir. I'm competing with these Coke bottle

1 machines.

2 AUDIENCE: Well, I've got one in here.

3 MR. MATORY: Try to get you an aerial photo.

4 AUDIENCE: We've got Ross Metals here. Is  
5 it going to come up the road? You can keep that.

6 MR. MATORY: Up here on the map, in terms of  
7 pretty much everything inside the fence line, that's  
8 the primary extent of where you would expect to see  
9 dirt excavations. And again, this landfill area where  
10 a lot of slag material from the property was buried,  
11 that, and then we've already taken out an area in this  
12 wetland area that went down to about a depth of six  
13 feet. I mean, I'm sorry, six inches, half a foot. So  
14 that is pretty much the extent of the soils removal  
15 that's going to take place.

16 MISS LINDA: Well, really --

17 MR. MATORY: Now, ma'am --

18 MISS LINDA: Linda.

19 MR. MATORY: Miss Linden, where are you in  
20 relation to --

21 MISS LINDA: Right next door

22 MR. MATORY: So you're right here where the  
23 arrow is?

24 MISS LINDA: Mm-hmm

25 MR. MATORY: So, again, we're going to look,

1 make sure we look at Miss Linden's property to make  
2 certain that there hasn't been any more storm water  
3 drainage. Yeah, I see where we --

4 MR. ENGLISH: That's here her.

5 MR. MATORY: Yeah, it looks like they pretty  
6 much took out this area at one point. So before we're  
7 done, we'll make sure we go back and look into her yard  
8 where it's coming over the fenced property.

9 So did that answer your question?

10 AUDIENCE: Yeah, but I really -- the  
11 question I'm trying to ask is this is only on the Ross  
12 Metals? It only on Ross Metals property?

13 MR. MATORY: Is it only on Ross Metals's  
14 property.

15 AUDIENCE: The county property. But state  
16 got it now. That's mainly what you all working on?

17 MR. MATORY: Well, again, I'm going to have  
18 to depend on people in the room, but it looks like  
19 there is -- it's kind of like in limbo in terms of who  
20 owns the property right now.

21 AUDIENCE: Right. Right.

22 MR. MATORY: Apparently the county has not  
23 put a lien on it, but it's definitely -- the former  
24 owners is Ross Metals. They're not paying taxes on it  
25 either, so it's kind of in limbo on who the ownership

1 is.

2 AUDIENCE: You see where I'm drawing in  
3 there? So you tell what Ross Metals owns that or not?

4 MR. MATORY: Can I tell if they --

5 AUDIENCE: The area we're looking at, three  
6 and one-third acres --

7 MR. MATORY: Do you want to just point out  
8 what you're talking about?

9 AUDIENCE: Is this the same as my map? Is  
10 that what we're looking at?

11 MR. MATORY: Should be.

12 AUDIENCE: Do you see a gas line there?

13 AUDIENCE: Here's the railroad. Your house  
14 is right about here. Miss Linda's house is right here.

15 AUDIENCE: Right. Right.

16 AUDIENCE: Big place where they put all of  
17 that slag in the back and buried it. That's this place  
18 right here. And the slough that ran behind it is right  
19 there.

20 AUDIENCE: Right.

21 AUDIENCE: The sewer ponds go on this side.  
22 Okay? The sewer lagoon, there's one here and one here.  
23 It's not on this map. So it's turned around. So this  
24 is Railroad Street, and your house would be right about  
25 here if the map was big enough.

1 THE COURT: Thank you.

2 AUDIENCE: It's hard to read that map.

3 MR. MATORY: Yeah, I don't know if this  
4 really gives you perspective from a local standpoint.

5 Thank you, sir.

6 Was there any other question? Okay. I  
7 want to make sure I give this back to you.

8 AUDIENCE: Thank you very much.

9 MR. MATORY: You're welcome.  
10 Any more questions?

11 AUDIENCE: If the dirt is treated and no  
12 longer contaminated, why does it all have to be taken  
13 back out and resources brought in? Because it still  
14 contains the lead?

15 MR. MATORY: Let me think about that. If  
16 the dirt is treated then why does it have to be taken  
17 off?

18 AUDIENCE: You say it's no longer hazardous  
19 material and not contaminated anymore.

20 MR. MATORY: Well, again, the idea -- it's  
21 still going to contain the lead, but the idea is by --  
22 when you add the additives to it, which is like  
23 Portland cement basically, the idea is you fix or bond  
24 the lead into the dirt, so that when it rains in the  
25 future you won't see any migration of that lead into

1       someplace where you don't want it to go.

2                   Now, the idea of when we take it off-site  
3       it's going to be in a controlled, managed area,  
4       definitely not in a flood plain like where this is, so  
5       we're going to take it -- so technically it won't be  
6       hazardous because when we run a test on it, you put  
7       water into it it won't leach out anymore. But whether  
8       or not that is a, you know, like a long-term fix, I  
9       don't know, but I do know that when you take it to an  
10      area where it's going to be managed, not in a flood  
11      plain, not accessible to groundwater anymore, it's in a  
12      better location than where it is now.

13                  MR. SAUNDERS: Is it a fair assessment to  
14      say that even though it's treated, it's still  
15      contaminated?

16                  MR. MATORY: Even though it's treated, it  
17      still contains the lead contamination.

18                  MR. ENGLISH: Yes.

19                  MR. SAUNDERS: So is the answer yes?

20                  MR. MATORY: Well, again --

21                  MR. SAUNDERS: Or am I missing a distinction  
22      here?

23                  MR. MATORY: Well, the distinction is -- the  
24      distinction is like it's an analytical definition and a  
25      legal definition. It's not contaminated once the

1 treatment takes place, or once we add -- place the  
2 additives in the soil mixture because it no longer  
3 leaches, so, therefore, it is not contaminated, but it  
4 still does contain lead contamination.

5 MR. SAUNDERS: I got you.

6 MR. MATORY: So legally, no, it would not be  
7 when you add all of the mixtures to it, but it would  
8 contain levels of lead.

9 MR. SAUNDERS: Yeah. Okay.

10 Because of the -- Miss Linda's house being  
11 right there in the storm water, don't you think it  
12 might be worth you all reconsidering the storm water  
13 monitoring and treatment if it did? At least the  
14 storm water on it treated?

15 MR. MATORY: Well, again, the idea is that  
16 we're going to be taking the piles that are there  
17 off-site in the short-term, and, again, before we leave  
18 we're going to make sure that we look at her property  
19 again and make sure that in the interim some areas of  
20 her property have not been recontaminated.

21 It's one of those things where if it is a  
22 storm water migration problem, or if there is some  
23 idea, then if it's there it's there. We'll run  
24 analysis on it, and if it's there, it's probably going  
25 to be in the top inch or so in the soil. It's not

1     going to be -- I don't know how big the excavation was  
2     last time. Was it really deep, or how far down did  
3     they go?

4             MISS LINDA: I could stand in it. A foot.

5             MR. MATORY: That was deep. But we're not  
6     expecting it to be a situation this time, given the  
7     fact that you've got more controlled piles. That means  
8     just not running willy-nilly wherever.

9             AUDIENCE: So during treatment you're not  
10    going to run any, because the property is set up with  
11    curves to keep the storm water -- they had to treat it  
12    when they were running, and there's a sump in the back.  
13    I don't know if you all filled that back up. While you  
14    all do the treatment, you all are not planning any  
15    treatment of the storm water, or testing of the storm  
16    water?

17            MR. MATORY: Another idea, there will  
18    probably be some berms that's set up to prevent water  
19    from leaving the site. That's just standard practice.  
20    I mean, when you do a hazardous waste clean-up, you do  
21    want to contain it to the extent that you can. So, if  
22    we --

23            MR. ENGLISH: They're probably going to mix  
24    it in small batches in sort of a contained area, mix  
25    it, accept a batch and then haul it out. Is the way

1 I'm guessing. If they're going to do it all at once,  
2 they're going to have a big job on their hands.

3 And as far as the water, and you tell me if  
4 I'm wrong here, but I prefer not to see any storm water  
5 going on your property, or anybody else's property  
6 around here. If that's the case, they need to set up  
7 fences and barriers so it doesn't happen. But like  
8 Derek said, it would be wise to go see your property,  
9 see if there's any sediments or anything there that may  
10 be contaminated and the soils need to be removed again.

11 MR. SAUNDERS: Is there any way that some  
12 immediate action, corrective action could be taken to  
13 control this run-off on her property, even before  
14 September when you anticipate getting restarted?

15 MR. MATORY: Yes.

16 MR. SAUNDERS: I'll look into that.

17 MR. MATORY: Yes.

18 MR. ENGLISH: I will look into that.

19 MR. SAUNDERS: I think that would really  
20 call for it.

21 AUDIENCE: Why is it, on that picture you've  
22 got, not showing all of Ross Metals? Ross Metals is  
23 kind of like an L, and on the picture you're showing  
24 right straight down from the side of her house straight  
25 back. You're not showing it eastward.

1                   MR. MATORY: Well, again, the focus here was  
2     the groundwater. This map is focusing on the  
3     groundwater.

4                   AUDIENCE: Okay.

5                   MR. MATORY: So that was -- it was just  
6     basically showing all of the wells that we relied on,  
7     to assess whether or not there's any problem with the  
8     groundwater there.

9                   MR. MATORY: If any of you are internet  
10    active, there is a web site that's set up for Ross  
11    Metals that contains like some of the background  
12    information if you want to look at it further. Again,  
13    the most complete information is going to be in the  
14    repository, and that's going to be at the city hall.

15                   You know, I've got this in my handout.

16                   UNIDENTIFIED SPEAKER: Oh, do you?

17                   MR. MATORY: So, are there any more  
18    questions anybody?

19                   Okay. Well, thank you all for coming out.  
20    Appreciate it.

21   (Whereupon, the deposition  
22   was concluded at 7:46 p.m.)

23   \* \* \*

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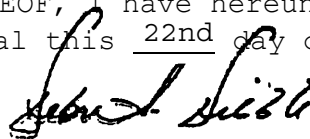
1     STATE OF TENNESSEE     )  
  )     ss  
2     COUNTY OF SHELBY     )

3  
4                   THIS IS TO CERTIFY that the foregoing  
5 proceeding in the foregoing cause named, was taken  
6 before me, DEBRA A. DIBBLE, a Certified Shorthand  
Reporter and Notary Public in and for the State of  
Tennessee, residing at Oakland, Tennessee.

7                   That the testimony of said proceeding was  
8 reported by me in Stenotype, and thereafter caused by  
9 me to be transcribed into typewriting, and that a full,  
10 true and correct transcription of said testimony so  
taken and transcribed id set forth in the foregoing  
annexed transcript.

11                   I further certify that I am not of kin or  
12 otherwise associated with any of the parties to said  
13 cause of action, and that I am not interested in the  
event thereof.

14                   IN WITNESS WHEREOF, I have hereunto set my  
15 hand and affixed my Notarial Seal this 22nd day of  
16 August , 2002.



17  
18                   Debra A. Dibble, C.S.R., R.P.R.  
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